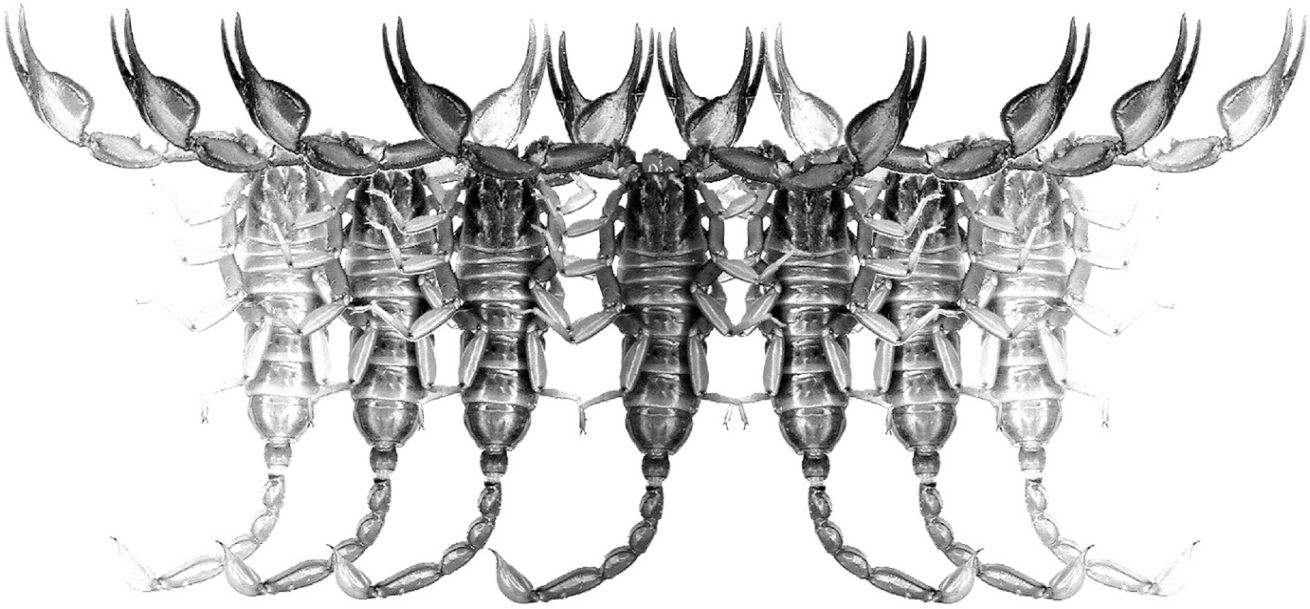
Euscorpius

Occasional Publications in Scorpiology



Nine new species of *Scorpiops* Peters, 1861 (Scorpiones: Scorpiopidae) from China, India, Nepal, and Pakistan

František Kovařík

March 2020 — No. 302

Euscorpius

Occasional Publications in Scorpiology

EDITOR: **Victor Fet**, Marshall University, **'fet@marshall.edu'**

ASSOCIATE EDITOR: **Michael E. Soleglad, 'msoleglad@gmail.com'**

TECHNICAL EDITOR: **František Kovařík, 'kovarik.scorpio@gmail.com'**

Euscorpius is the first research publication completely devoted to scorpions (Arachnida: Scorpiones). ***Euscorpius*** takes advantage of the rapidly evolving medium of quick online publication, at the same time maintaining high research standards for the burgeoning field of scorpion science (scorpiology). ***Euscorpius*** is an expedient and viable medium for the publication of serious papers in scorpiology, including (but not limited to): systematics, evolution, ecology, biogeography, and general biology of scorpions. Review papers, descriptions of new taxa, faunistic surveys, lists of museum collections, and book reviews are welcome.

Derivatio Nominis

The name ***Euscorpius*** Thorell, 1876 refers to the most common genus of scorpions in the Mediterranean region and southern Europe (family Euscorpiidae).

Euscorpius is located at: https://mds.marshall.edu/euscorpius/
Archive of issues 1-270 see also at: http://www.science.marshall.edu/fet/Euscorpius

(Marshall University, Huntington, West Virginia 25755-2510, USA)

ICZN COMPLIANCE OF ELECTRONIC PUBLICATIONS:

Electronic ("e-only") publications are fully compliant with ICZN (*International Code of Zoological Nomenclature*) (i.e. for the purposes of new names and new nomenclatural acts) when properly archived and registered. All ***Euscorpius*** issues starting from No. 156 (2013) are archived in two electronic archives:

- **Biotaxa,** http://biotaxa.org/Euscorpius (ICZN-approved and ZooBank-enabled)
- **Marshall Digital Scholar**, http://mds.marshall.edu/euscorpius/. (This website also archives all *Euscorpius* issues previously published on CD-ROMs.)

Between 2000 and 2013, ICZN ***did not accept online texts*** as "published work" (Article 9.8). At this time, *Euscorpius* was produced in two ***identical*** versions: online (*ISSN 1536-9307*) and CD-ROM (*ISSN 1536-9293*) (laser disk) in archive-quality, read-only format. Both versions had the identical date of publication, as well as identical page and figure numbers. ***Only copies distributed on a CD-ROM*** from ***Euscorpius*** in 2001-2012 represent published work in compliance with the ICZN, i.e. for the purposes of new names and new nomenclatural acts.

In September 2012, ICZN Article 8. What constitutes published work**,** has been amended and allowed for electronic publications, disallowing publication on optical discs. From January 2013, ***Euscorpius*** discontinued CD-ROM production; only online electronic version (ISSN 1536-9307) is published. For further details on the new ICZN amendment, see http://www.pensoft.net/journals/zookeys/article/3944/.

Publication date: 9 March 2020

http://zoobank.org/urn:lsid:zoobank.org:pub:6C4BC10A-F418-48E0-8BF8-D33DE4BA62A2

Euscorpius — Occasional Publications in Scorpiology. 2020, No. 302

Nine new species of *Scorpiops* Peters, 1861 (Scorpiones: Scorpiopidae) from China, India, Nepal, and Pakistan

František Kovařík

P. O. Box 27, CZ-145 01 Praha 45, Czech Republic; http://www.scorpio.cz

http://zoobank.org/urn:lsid:zoobank.org:pub:6C4BC10A-F418-48E0-8BF8-D33DE4BA62A2

Summary

Nine new species are described: *Scorpiops furai* **sp. n.** (India), *S. grosseri* **sp. n.** (India), *S. harmsi* **sp. n.** (Nepal), *S. hofereki* **sp. n.** (Pakistan), *S. kejvali* **sp. n.** (India), *S. tryznai* **sp. n.** (India), *S. wrzecionkoi* **sp. n.** (China), *S. yagmuri* **sp. n.** (Pakistan), and *S. zubairi* **sp. n.** (Pakistan), fully complemented with color photographs of preserved specimens. New species are distinguished from all other species of the family Scorpiopidae by combinations of eight major characters: position of pedipalp chelal trichobothrium Eb_3; number of pedipalp patella ventral trichobothria; shape of pedipalp fingers; number of inner accessory denticles (IAD) of pedipalp movable finger; chela length to width ratio; telson length to depth ratio; total length; and pecten morphology. Also, *Scorpiops vonwicki* Birula, 1913 **stat. n.** (India) is elevated to species rank; a new diagnosis of its only known specimen (female holotype) is given, fully illustrated with color photographs; and the fascinating story of its discovery is revealed for the first time.

Introduction

The genus *Scorpiops* was described by Peters (1861: 510) with type species *Scorpio hardwickii* Gervais, 1843. Later, several related genera or subgenera (later elevated to genera) were described, all now placed in the family Scorpiopidae: *Parascorpiops* Banks, 1928, *Dasyscorpiops* Vachon, 1974, *Alloscorpiops* Vachon, 1980, *Euscorpiops* Vachon, 1980, *Neoscorpiops* Vachon, 1980, *Plethoscorpiops* Lourenço, 2017, and *Vietscorpiops* Lourenço & Pham, 2015, as well as subgenus *Alloscorpiops* (*Laoscorpiops*) Lourenço, 2013 (now in synonymy with *Alloscorpiops*). The taxonomic position of these genera is unclear. Validity of generic characters was disputed already by Francke (1976) and Kovařík (2000); all these genera require a revision.

Methods, Material & Abbreviations

Nomenclature and measurements follow Stahnke (1971), Soleglad & Sissom (2001), Kovařík (2009), and Kovařík & Ojanguren Affilastro (2013), except for trichobothriotaxy (Vachon, 1974).

Specimen Depositories: FKCP (František Kovařík, private collection, Prague, Czech Republic; will in future be merged with the collections of the National Museum of Natural History, Prague, Czech Republic); ZISP (Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia).

Morphometrics: D, depth; L, length; W, width.

Movable finger dentition: ID, inner denticles; IAD, inner accessory denticles; MD, median denticles; OD, outer denticles.

Family Scorpiopidae Kraepelin, 1905

Genus ***Scorpiops*** Peters, 1861

(Figures 1–241, Tables 1–3)

Scorpiops Peters, 1861: 510; Kraepelin, 1899: 179–182; Vachon, 1980: 143–159; Tikader & Bastawade, 1983: 403–452, figs. 1129–1246; Sissom, 1990: 114; Kovařík, 1998: 142; Lourenço, 1998: 246; Fet, 2000: 491–495; Kovařík, 2000: 162–198, figs. 1–7, 14–22, 25, 28, 29, 31–72 (in part); Soleglad & Sissom, 2001: 93–97, figs. 3, 13–14, 86, 96, 101, 114, 147, 159, 183, 202, 220; Qi et al., 2005: 2–14, figs. 1–46; Kovařík, 2009: 27, 32; Kovařík & Ahmed, 2009: 1–10, figs. 1–26.

Type species. *Scorpio hardwickii* Gervais, 1843.

Diagnosis. Total length 24–75 mm. Inner accessory denticles present on pedipalp chelal fingers. Outer denticles (OD) of pedipalp chelal fingers are present but displaced to outer aspect of fingers. Pedipalp chelal finger denticles aligned in straight row or rows. Pedipalp chela is flat in appearance. Trichobothrial pattern type C. Two subdistal denticles present on cheliceral movable finger dorsal edge. Cheliceral movable finger ventral edge either smooth or with crenulations. Ventral edge of cheliceral movable finger equipped with 5–7 (usually 7) denticles. Ventral aspect of cheliceral fixed finger smooth, without denticles. Two pedal spurs present on legs. Tarsal spurs on legs absent. Sternum pentagonal in shape. Hemispermatophore lamelliform in shape. Telson without

Dimensions (MM)		*S. furai* **sp. n.** ♀ **holotype**	*S. grosseri* **sp. n.** ♀ **holotype**	*S. harmsi* **sp. n.** ♀ **holotype**	*S. hofereki* **sp. n.** ♀ **holotype**
Carapace	L / W	7.75 / 7.64	8.05 / 7.50	7.71 / 7.68	6.62 / 6.07
Mesosoma	L	17.90	21.72	20.12	19.42
Tergite VII	L / W	3.08 / 6.69	4.20 / 6.42	3.99 / 6.13	3.06 / 5.03
Metasoma + telson	L	26.66	28.80	26.95	22.65
Segment I	L / W / D	2.81 / 3.46 / 2.85	3.30 / 2.75 / 2.49	2.72 / 3.17 / 2.70	2.30 / 2.55 / 2.11
Segment II	L / W / D	3.20 / 3.06 / 2.87	3.66 / 2.61 / 2.45	3.12 / 2.76 / 2.33	2.80 / 2.15 / 1.91
Segment III	L / W / D	3.43 / 2.95 / 2.70	4.10 / 2.37 / 2.38	3.39 / 2.52 / 2.60	2.99 / 1.96 / 1.84
Segment IV	L / W / D	3.90 / 2.85 / 2.50	4.15 / 2.37 / 2.17	3.97 / 2.36 / 2.30	3.40 / 1.78 / 1.81
Segment V	L / W / D	6.41 / 2.56 / 2.32	6.41 / 2.13 / 2.17	6.53 / 2.09 /2.15	5.48 / 1.74 / 1.65
Telson	L / W / D	6.91 / 2.42 / 2.25	7.18 / 2.80 / 2.71	7.22 / 2.32 / 2.18	5.68 / 2.16 / 2.13
Pedipalp	L	26.69	26.99	26.99	23.6
Femur	L / W	6.29 / 2.64	6.60 / 2.71	6.60 / 2.46	6.00 / 2.25
Patella	L / W	6.75 / 2.92	6.64 / 3.08	6.39 / 2.73	5.58 / 2.42
Chela	L	13.65	13.75	14.00	12.02
Manus	W / D	4.82 / 4.35	5.16 / 3.83	5.00 / 3.70	4.12 / 3.05
Movable finger	L	6.96	7.48	6.56	6.67
Total	**L**	**52.31**	**58.57**	**54.78**	**48.69**

Table 1. Comparative measurements of adults of *Scorpiops furai* **sp. n.**, *S. grosseri* **sp. n.**, *S. harmsi* **sp. n.** and *S. hofereki* **sp. n.** Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (D).

subaculear tubercle. Median eyes and tubercle present. Two or three pairs of lateral eyes present. Patella of pedipalps usually with 16–19 external trichobothria. Ventral surface of manus usually bears 4 trichobothria, of which V_4, if not absent, is usually located on ventral aspect of chela. Trichobothrium Eb_3 on external surface of chela, usually located between trichobothria *Db* and *Dt*, along proximo-distal axis of manus.

Scorpiops furai **sp. n.**

(Figures 1–22, 240–241, Table 1)

http://zoobank.org/urn:lsid:zoobank.org:act:75F84D79-5DF7-4195-9CFD-27B40E6AA91D

Type locality and type repository. India, Meghalaya State, West Garo Hills District, Tura, 25°30.7'N 90°13.9'E, ca 700 m a. s. l. (Fig. 241); FKCP.

Type material. **India**, Meghalaya State, West Garo Hills District, Tura, 25°30.7'N 90°13.9'E, ca 700 m a. s. l., 5-7 May 1996, 1♀ (holotype), leg. E. Jendek & O. Šauša; West Garo Hills, ca 1100 m a. s. l., 9-17 May 1996, 1♂juv. (paratype), leg. E. Jendek & O. Šauša; Ri-Bhoi District, Nongpoh env., 25.9°N, 91.88°E (Fig. 241), 1♀ (paratype), December 2007, leg. V. Fura, FKCP.

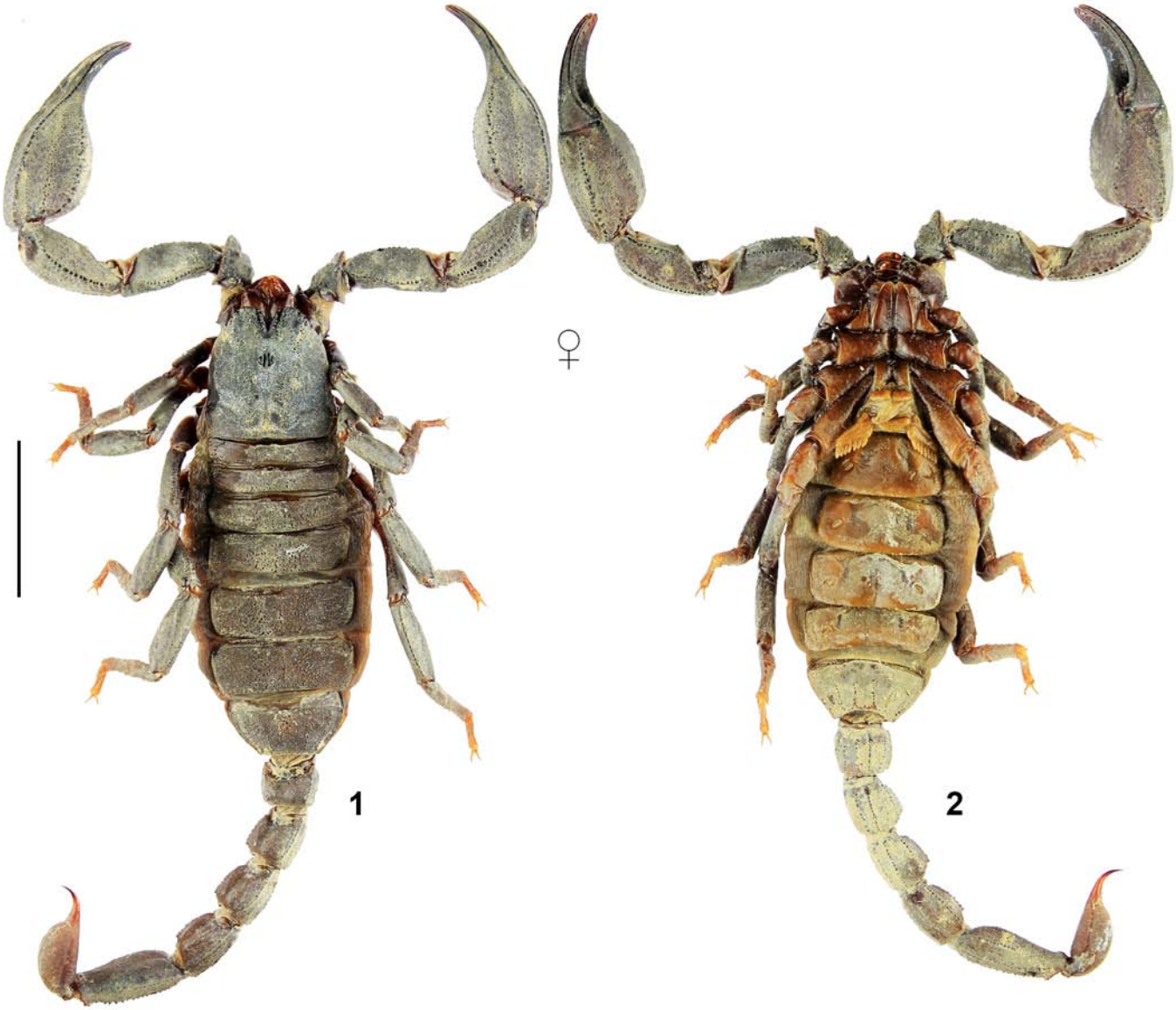
Etymology. The species epithet is a patronym honoring Vladimír Fura, the collector of paratype of the new species.

Diagnosis (♀♂juv.). Total length 45–52 mm. Base color uniformly reddish brown to black, telson and metatarsus of legs reddish brown. Pectinal teeth number 8 in male and 7–8 in females, fulcra absent, pectens with two marginal lamellae and a compact middle lamella. Patella of pedipalp with 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 7 ventral trichobothria. Chela of pedipalp with 4 ventral trichobothria located on ventral surface. Fingers of pedipalps straight in female. Chela length to width ratio 2.83 in female. Chelal trichobothrium Eb_3 is located in proximal half of external surface between trichobothria *Dt* and *Db*. Pedipalp movable finger with 51–58 IAD, which form a second row, parallel with MD (ca 60 in number); there are also 4 ID and 12–13 OD present. Tarsomere II of legs with 4–6 stout median ventral spines in a row and two other parallel spines. Telson elongate and sparsely granulate, length to depth ratio 3.07 in females; annular ring indicated.

Description (♀♂juv.). Total length 45–52 mm of females, adult male unknown. The habitus is shown in Figs. 1–2. For position and distribution of trichobothria of pedipalps, see Figs. 3–9. Fingers of pedipalps are straight in females (Fig. 4).

Coloration (Figs. 1–2). The base color is uniformly reddish brown to black, telson and metatarsus of legs reddish brown, sternites lighter, reddish brown. Chelicerae are yellowish brown and reticulate, fingers black.

Carapace and mesosoma (Figs. 1–2, 13–14). The entire carapace is covered with large and minute granules; carinae are absent. The anterior margin of the carapace is markedly depressed, convex in the middle. The carapace bears three lateral eyes. The mesosoma is granulated, with one median carina. Tergite VII is pentacarinate. The sternites are smooth to finely granulated with two parallel furrows except sternite VII, which bears four sparsely granulate carina. Pectinal teeth number 8 in male and 7–8 in females, fulcra are absent. The



Figures 1–**2**. *Scorpiops furai* **sp**. **n**., female holotype in dorsal (1) and ventral (2) views. Scale bar: 10 mm.

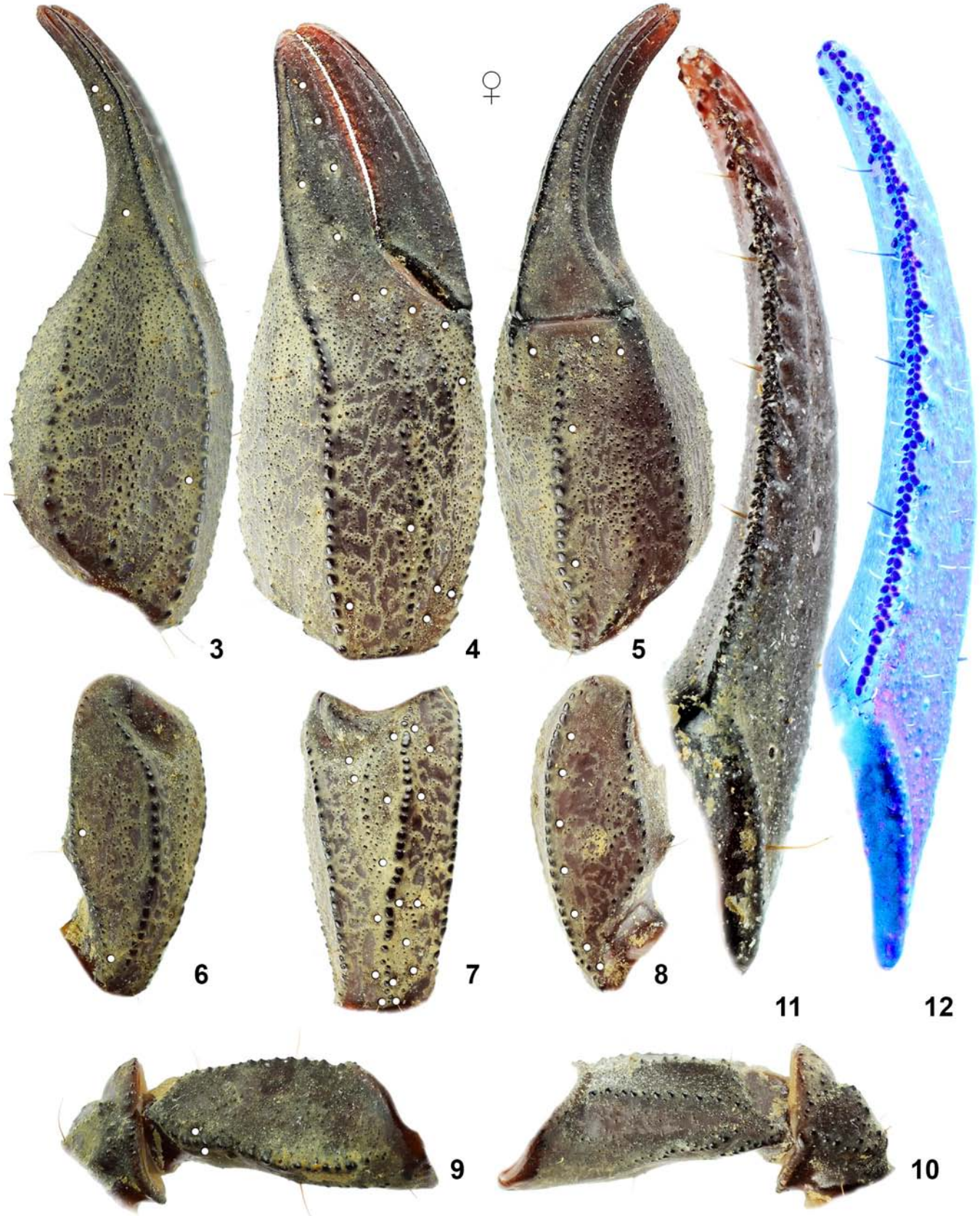
pectens have two marginal lamellae and a compact middle lamella.

Metasoma and telson (Figs. 19–22). The metasoma is sparsely hirsute and granulated, with sparse, relatively large granules. Metasomal segment I with 10 carinae, II–IV with 8 carinae, and V with 5 carinae. The median lateral carinae of metasoma II and V are indicated by isolated granules that may coalesce into carinae. The dorsolateral carinae of segments III and IV are granulate with sharp granules, which are not posteriorly terminated with pronounced tooth. The telson is elongate and granulate, annular ring indicated in females.

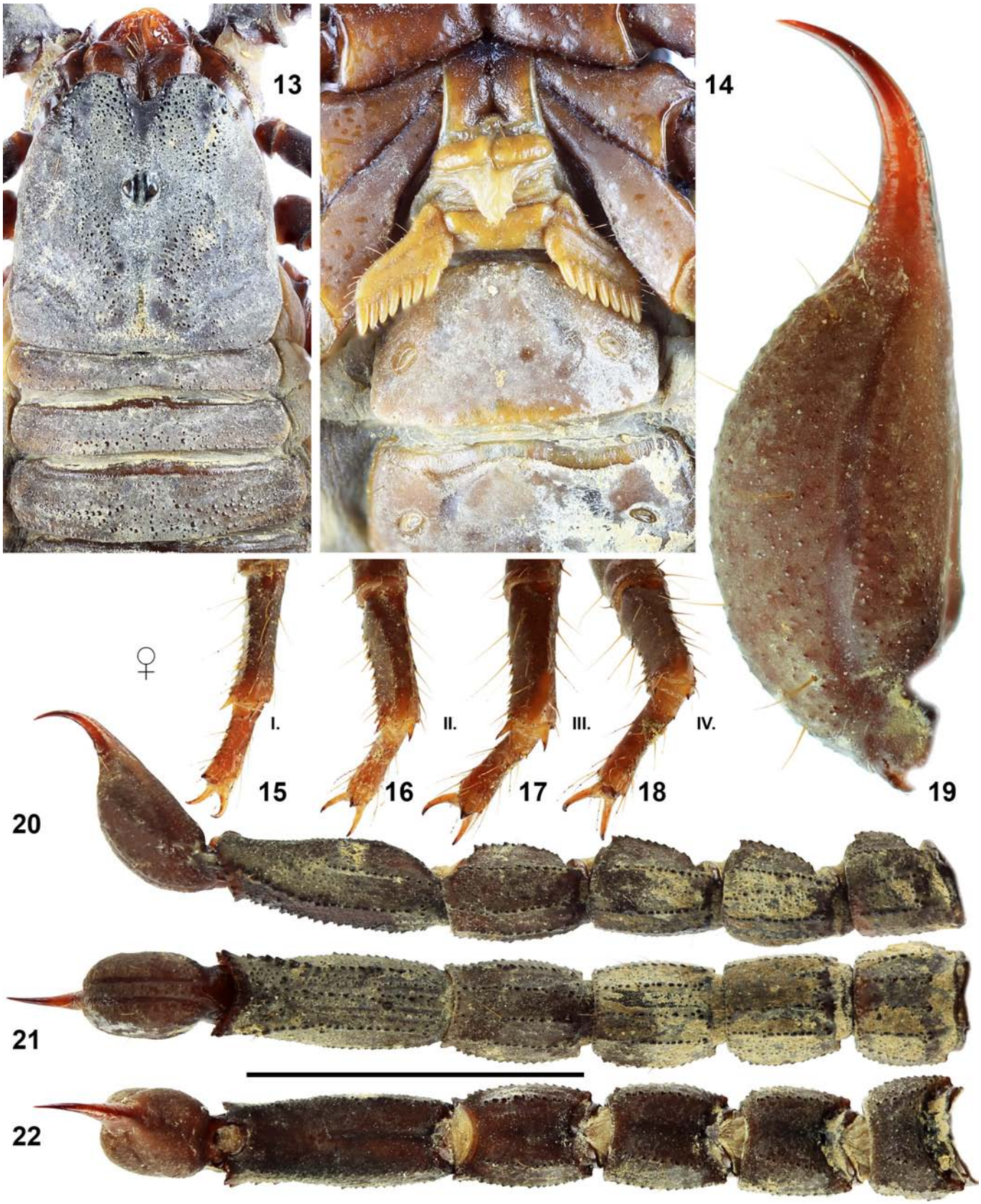
Pedipalps (Figs. 3–12). The pedipalps are very sparsely hirsute. The patella bears 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external trichobothria and 7 ventral trichobothria. The chela bears 4 ventral trichobothria located on the ventral surface. The femur and patella are granulated. The femur has 5 granulose carinae, of which the ventral can be incomplete, and the patella has 5 complete carinae with reduced internal tubercle. The manus dorsally bears fine, rounded granules, which are in the central area represented by large granules forming a longitudinal irregular incomplete carina. The external surface of the chela is covered by minute granules and bears an almost complete median carina with larger sparse granules. The movable fingers with 51–58 IAD, which form a second row, parallel to MD (ca 60 in number). There are also 4 ID and 12–13 OD present.

Legs (Figs. 15–18). The tibia and tarsomeres of legs with several setae not arranged into bristlecombs on dorsal surfaces but with rows of spines on dorsolateral and ventrolateral surface. Tarsomere II of legs I–IV with 4–6 stout median ventral spines in a row and two other parallel spines. The femur bears 3–4 and patella, 4–5 incomplete carinae; both femur and patella are finely granulated.

Measurements. See Table 1.



Figures 3–**12**. *Scorpiops furai* **sp**. **n**., female holotype, pedipalp segments. Chela dorsal (3), external (4) and ventral (5) views. Patella dorsal (6), external (7) and ventral (8) views. Femur and trochanter dorsal (9), and ventral (10) views. Movable finger dentition under white light (11) and UV fluorescence (12). Trichobothrial pattern is indicated by white circles.



Figures 13–**22**. *Scorpiops furai* **sp**. **n**., female holotype. Carapace and tergites I–III (13), posterior coxosternal area and sternites III–IV (14). Left legs I–IV, retrolateral aspect (15–18 respectively). Telson lateral (19). Metasoma and telson lateral (20), ventral (21), and dorsal (22) views. Scale bar: 10 mm (20–22).

Affinities. The described features distinguish *S. furai* **sp. n.** from all other species of the genus. The combination of six characters (chelal trichobothrium Eb_3 located in proximal half of external surface between trichobothria *Dt* and *Db*; fingers of pedipalps straight in female; pedipalp movable finger with 51–58 IAD; chela length to width ratio 2.8 in female; telson length to depth ratio 3.07 in female; and patella of pedipalp with 7 ventral trichobothria) is unique in the entire genus *Scorpiops*.

Distribution. India, Meghalaya State (Fig. 240).

Scorpiops grosseri sp. n.

(Figures 23–48, 240, Table 1)

http://zoobank.org/urn:lsid:zoobank.org:act:A35EF8E9-3C89-4CF7-99C1-4444D41C7C06

Type locality and type repository. India, Himachal Pradesh State, Shimla District, Narkanda, 31.26°N 77.45°E, 2646 m a. s. l.; FKCP.

Type material. **India**, Himachal Pradesh State, Shimla District, Narkanda, 31.26°N 77.45°E, 2646 m a. s. l., 3-5 May 2016, 1♀ (holotype), leg. W. Grosser, FKCP.

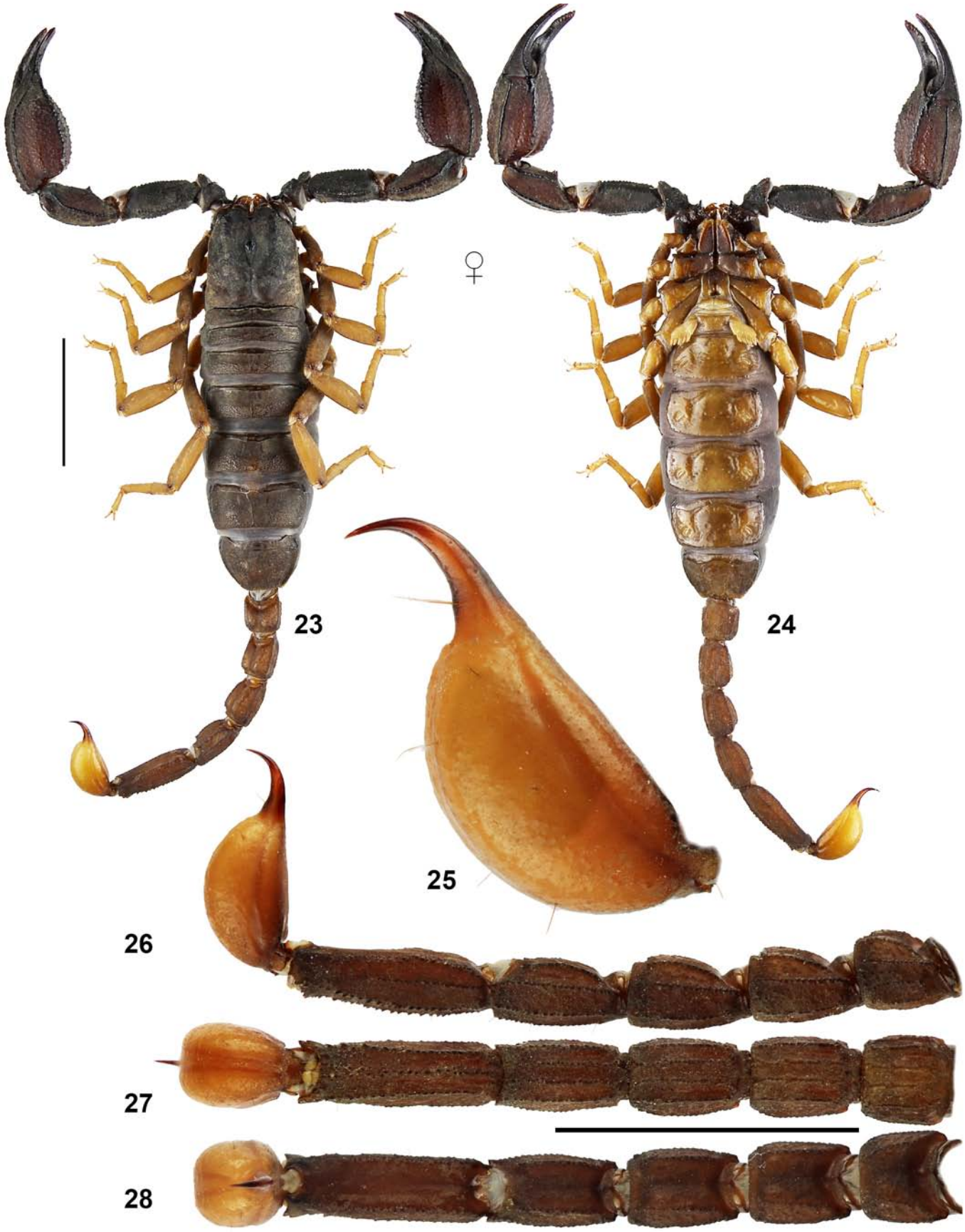
Etymology. The species epithet is a patronym honoring a Czech entomologist Walter Grosser, the collector of types of the new species.

Diagnosis (♀). Total length 59 mm long. Base color uniformly reddish brown to black, telson and legs yellow to yellowish brown. Pectinal teeth number 4–5 in female, fulcra absent; a pecten forms one compact unit with an incomplete furrow between places for marginal and middle lamellae. Patella of pedipalp with 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 7 ventral trichobothria. Chela of pedipalp with 4 ventral trichobothria located on ventral surface. Chelal trichobothrium Eb_3 is located in proximal half of external surface between trichobothria *Dt* and *Db*. Fingers of pedipalps flexed in female. Chela length to width ratio 2.66 in female. Pedipalp movable finger with 34–36 IAD, which form a second row, parallel to MD (60–65 in number); there are also 4 ID and 8 OD present. Tarsomere II of legs with 4–6 stout median ventral spines in a row and two other parallel spines. Telson bulbous and finely granulate, length to depth ratio 2.65 in female; annular ring present.

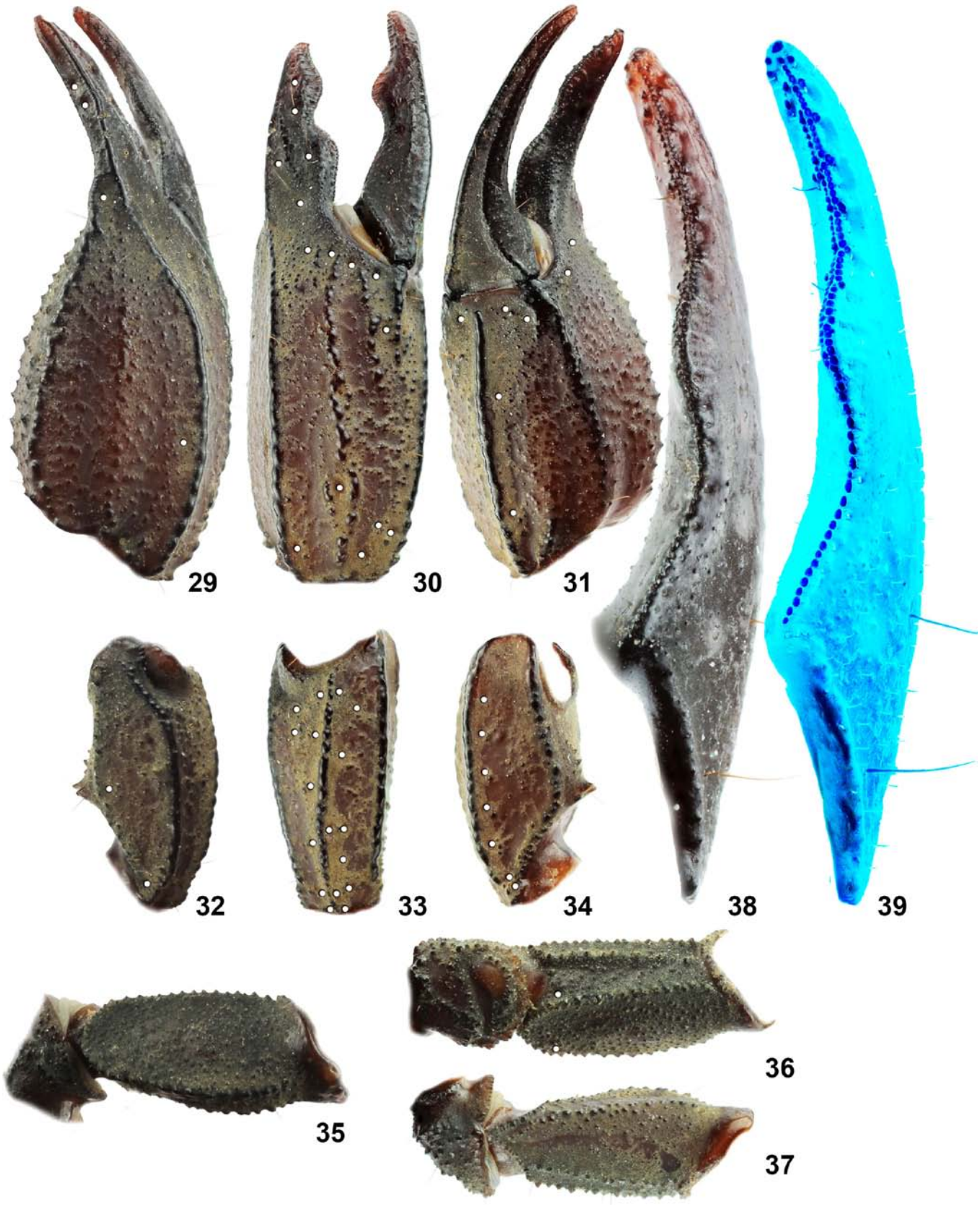
Description (♀). Total length of female holotype 59 mm, male unknown. The habitus is shown in Figs. 23–24. For position and distribution of trichobothria of pedipalps see Figs. 29–34 and 36. Fingers of pedipalps are flexed in the female (Fig. 30).
Coloration (Figs. 23–24). The base color is uniformly reddish brown to black. The telson and legs yellow to yellowish brown. Chelicerae are reddish black and reticulate.
Carapace and mesosoma (Figs. 40–43). The entire carapace is covered with large and minute granules; carinae are absent. The anterior margin of the carapace is markedly depressed, convex in the middle. The carapace bears three lateral eyes. The mesosoma is granulated, with one median carina. Tergite VII is pentacarinate. The sternites are smooth with two parallel furrows except sternite VII, which bears four sparsely granulate carinae. Pectinal teeth number 4–5 in female, fulcra are absent. A pecten forms one compact unit with an incomplete furrow between places for marginal and middle lamellae.
Metasoma and telson (Figs. 25–28). The metasoma is very sparsely hirsute and granulated, with relatively large granules. Metasomal segment I with 10 carinae, II–IV with 8 carinae, and V with 5 carinae. The median lateral carinae of metasoma V are indicated by isolated granules that may coalesce into carinae. The dorsolateral carinae of segments III and IV granulate with rounded granules, which are not posteriorly terminated with a pronounced tooth. The telson is bulbous and finely granulate, with annular ring present.
Pedipalps (Figs. 29–39). The pedipalps are very sparsely hirsute. The patella bears 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external trichobothria and 7 ventral trichobothria. The chela bears 4 ventral trichobothria located on the ventral surface. The femur and patella are granulated. The femur has 5 granulose carinae and the patella has 5 complete carinae with dorsal and ventral patellar spurs present. The manus dorsally bears granules, which are in the central area replaced by large granules forming a longitudinal irregular incomplete carina. The external surface of the chela is covered by minute and larger sparse granules, which form another complete median carina. The movable fingers with 34–36 IAD, which form a second row, parallel to MD (60–65 in number); there are also 4 ID and 8 OD present.
Legs (Figs. 44–48). The tibia and tarsomeres of legs with several setae not arranged into bristlecombs on dorsal surfaces but with rows of spines on dorsolateral and ventrolateral surface. Tarsomere II of legs I–IV with 4–6 stout median ventral spines in a row and two other parallel spines. The femur bears 3–4 and patella, 4–5 incomplete carinae; both femur and patella are finely granulated.
Measurements. See Table 1.

Affinities. The described features distinguish *S. grosseri* **sp. n.** from all other species of the genus. The combination of five characters (chelal trichobothrium Eb_3 located in proximal half of external surface between trichobothria *Dt* and *Db*; total length over 50 mm; fingers of pedipalps flexed in female; pedipalp movable finger with 34–36 IAD; and chela length to width ratio 2.6 in female) is unique in the entire genus *Scorpiops*.

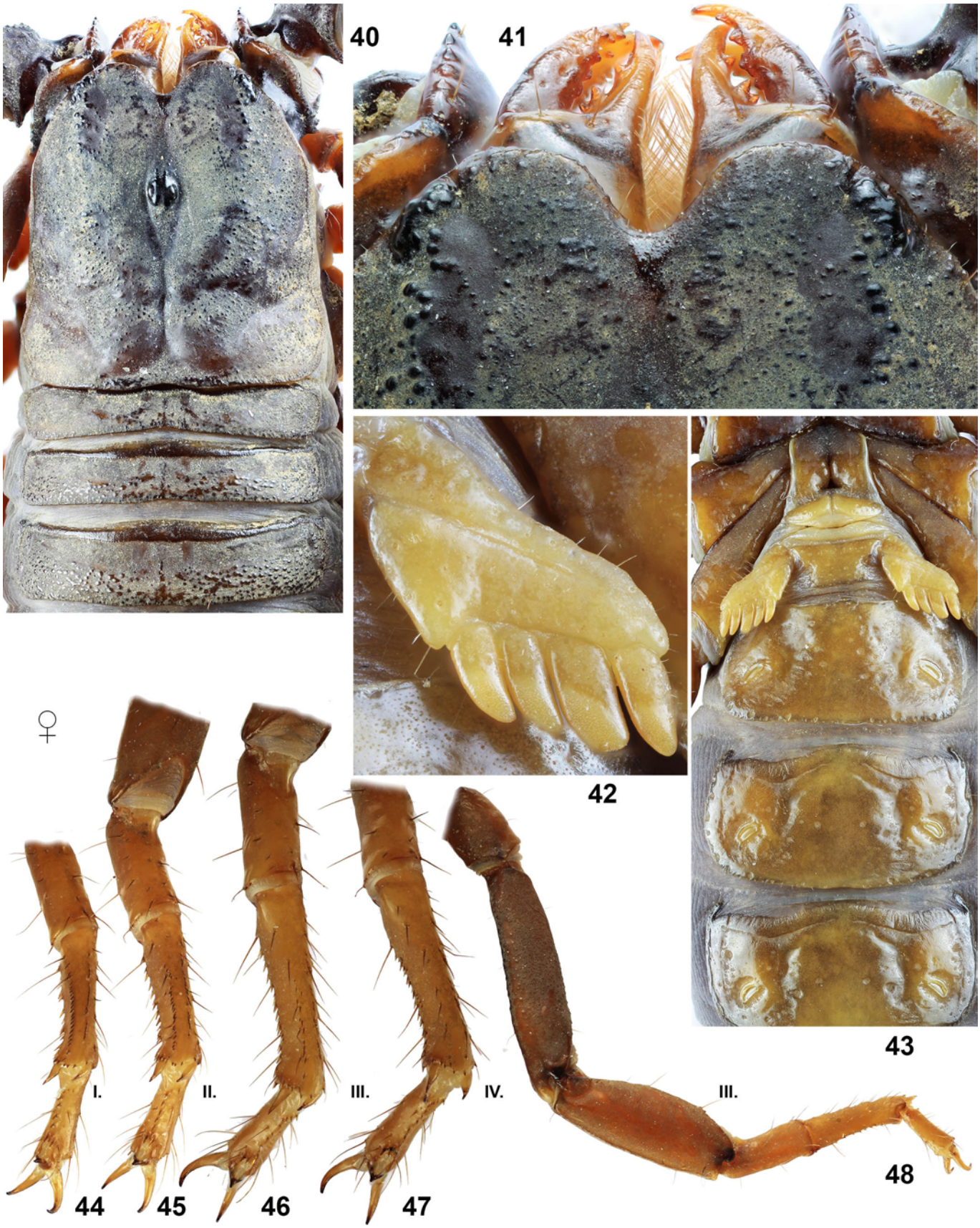
Distribution. India, Himachal Pradesh State (Fig. 240).



Figures 23–**28**. *Scorpiops grosseri* **sp**. **n**., female holotype. Dorsal (23) and ventral (24) views. Telson lateral (25). Metasoma and telson lateral (26), ventral (27), and dorsal (28) views. Scale bars: 10 mm (23–24, 26–28).



Figures 29–**39**. *Scorpiops grosseri* **sp**. **n**., female holotype, pedipalp segments. Chela dorsal (29), external (30) and ventral (31) views. Patella dorsal (32), external (33) and ventral (34) views. Femur and trochanter dorsal (35), internal (36), and ventral (37) views. Movable finger dentition under white light (38) and UV fluorescence (39). Trichobothrial pattern is indicated by white circles.



Figures 40–48. *Scorpiops grosseri* **sp. n.**, female holotype. Carapace and tergites I–III (40), anterior margin of carapace and chelicerae (41), pectine (42), posterior coxosternal area and sternites III–V (43). Left legs I–IV, retrolateral aspect (44–47 respectively) and leg III dorsal view (48).

Scorpiops harmsi sp. n.

(Figures 49–68, 240, Table 1)

http://zoobank.org/urn:lsid:zoobank.org:act:1975A1CE-FF6F-4811-9360-5AFE6C27AA92

Type locality and type repository. Nepal, Annapurna massif, Mardi Himal (28.48°N 83.927°E), Deuvali, 2100 m a. s. l.; FKCP.

Type material. **Nepal**, Annapurna massif, Mardi Himal (28.48°N 83.927°E), Deuvali, 2100 m a. s. l., 10.V.2001, 1♀ (holotype), leg. J. Schmidt, FKCP.

Etymology. The species epithet is a patronym honoring a German zoologist Danilo Harms, the curator of arachnids and myriapods at the Zoological Museum Hamburg, who greatly helped the author and his colleagues by loaning many type specimens of scorpions.

Diagnosis (♀). Total length 55 mm long. Base color uniformly reddish brown to black, telson and tarsomere II of legs yellowish to reddish brown. Pectinal teeth number 5–6 in female, fulcra absent; pecten forms one compact unit with an incomplete furrow between places for marginal and middle lamellae. Patella of pedipalp with 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 7 ventral trichobothria. Chela of pedipalp with 4 ventral trichobothria located on ventral surface. Chelal trichobothrium Eb_3 located in proximal half of external surface between trichobothria *Dt* and *Db*. Fingers of pedipalps very slightly undulate in female. Chela length to width ratio 2.8 in female. Pedipalp movable finger with 40–42 IAD, which form a second row, parallel to MD (70–73 in number); there are also 4 ID and 7–8 OD present. Tarsomere II of legs with 7–8 stout median ventral spines in a row and two other parallel spines. Telson elongate and very sparsely granulate, length to depth ratio 3.31 in female.

Description (♀ holotype). Total length 55 mm. Male unknown. The habitus is shown in Figs. 49–50. For position and distribution of trichobothria of pedipalps see Figs. 51–56. Fingers of pedipalps are very slightly undulate in female (Fig. 52).

Coloration (Figs. 49–50). The base color is uniformly reddish brown to black, telson and tarsomere II of legs yellowish to reddish brown, sternites reddish black. Chelicerae are reddish brown and reticulate, fingers reddish brown.

Carapace and mesosoma (Figs. 59–60). The entire carapace is covered with large and minute granules; carinae are absent. The anterior margin of the carapace is markedly depressed, convex in the middle. The carapace bears three lateral eyes. The mesosoma is granulated, with one median carina. Tergite VII is pentacarinate. The sternites are finely granulated with two parallel furrows except sternite VII, which bears four sparsely granulate carinae. Pectinal teeth number 7 in female, fulcra are absent. A pecten forms one compact unit with an incomplete furrow between places for marginal and middle lamellae.

Metasoma and telson (Figs. 65–68). The metasoma is sparsely hirsute and granulated, with relatively large granules. Metasomal segment I with 10 carinae, II–IV with 8 carinae, and V with 5 carinae. The median lateral carinae of metasoma II are indicated by isolated granules that may coalesce into carinae. The dorsolateral carinae of segments III and IV granulate with sharp granules, which are not posteriorly terminated with a pronounced tooth. The telson is elongate and very sparsely granulate, with annular ring slightly indicated in female.

Pedipalps (Figs. 51–58). The pedipalps are very sparsely hirsute. The patella bears 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external trichobothria and 7 ventral trichobothria. The chela bears 4 ventral trichobothria located on the ventral surface. The femur and patella are granulated. The femur has 5 granulose carinae and the patella has 5 complete carinae with reduced dorsal and ventral patellar spurs. The manus dorsally bears fine, rounded granules, which are not enlarged in the central area. The external surface of the chela is covered by minute and larger sparse granules. The movable fingers with 40–42 IAD, which form a second row, parallel to MD (70–73 in number); there are also 4 ID and 7–8 OD present.

Legs (Figs. 61–64). The tibia and tarsomeres of legs with several setae not arranged into bristlecombs on dorsal surfaces but with rows of spines on dorsolateral and ventrolateral surface. Tarsomere II of legs I–IV with 7–8 stout median ventral spines in a row and two other parallel spines. The femur bears 3–4 and patella, 4–5 incomplete carinae; both femur and patella are finely granulated.

Measurements. See Table 1.

Affinities. The described features distinguish *S. harmsi* **sp. n.** from all other species of the genus. The combination of five characters (chelal trichobothrium Eb_3 located in proximal half of external surface between trichobothria *Dt* and *Db*; fingers of pedipalps slightly undulate in female; pedipalp movable finger with 40–42 IAD; chela length to width ratio 2.8 in female; and patella of pedipalp with 7 ventral trichobothria) is unique in the entire genus *Scorpiops*.

Distribution. Nepal (Fig. 240).

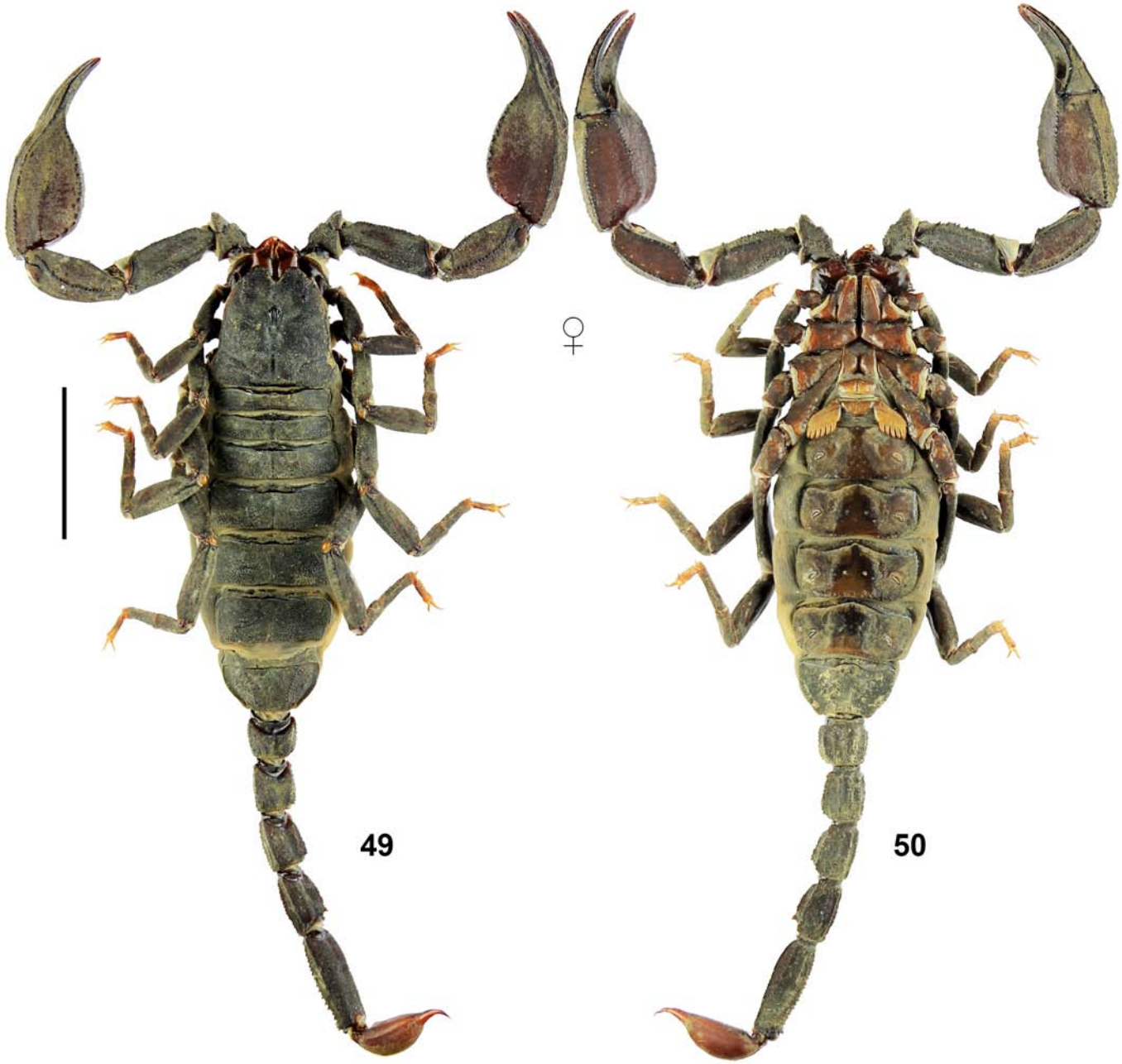
Scorpiops hofereki sp. n.

(Figures 69–92, 240, Table 1)

http://zoobank.org/urn:lsid:zoobank.org:act:10A76C0E-2759-47A0-8063-7DE46ADA205C

Type locality and type repository. Pakistan, Gilgit-Baltistan Region, Diamer District, Chilas, ca 35°25'N 74°06'E; FKCP.

Type material. **Pakistan**, Gilgit-Baltistan Region, Diamer District, Chilas, ca 35°25'N 74°06'E, 1♀ (holotype), 2005, FKCP; Khyber Pakhtunkhwa (formerly North-West Frontier) Province, Mansehra District, Kaghan Valley, Thathabaya, 2200 m a. s. l., 34.60°N 73.433°E, 1♀(paratype), 2005, FKCP.

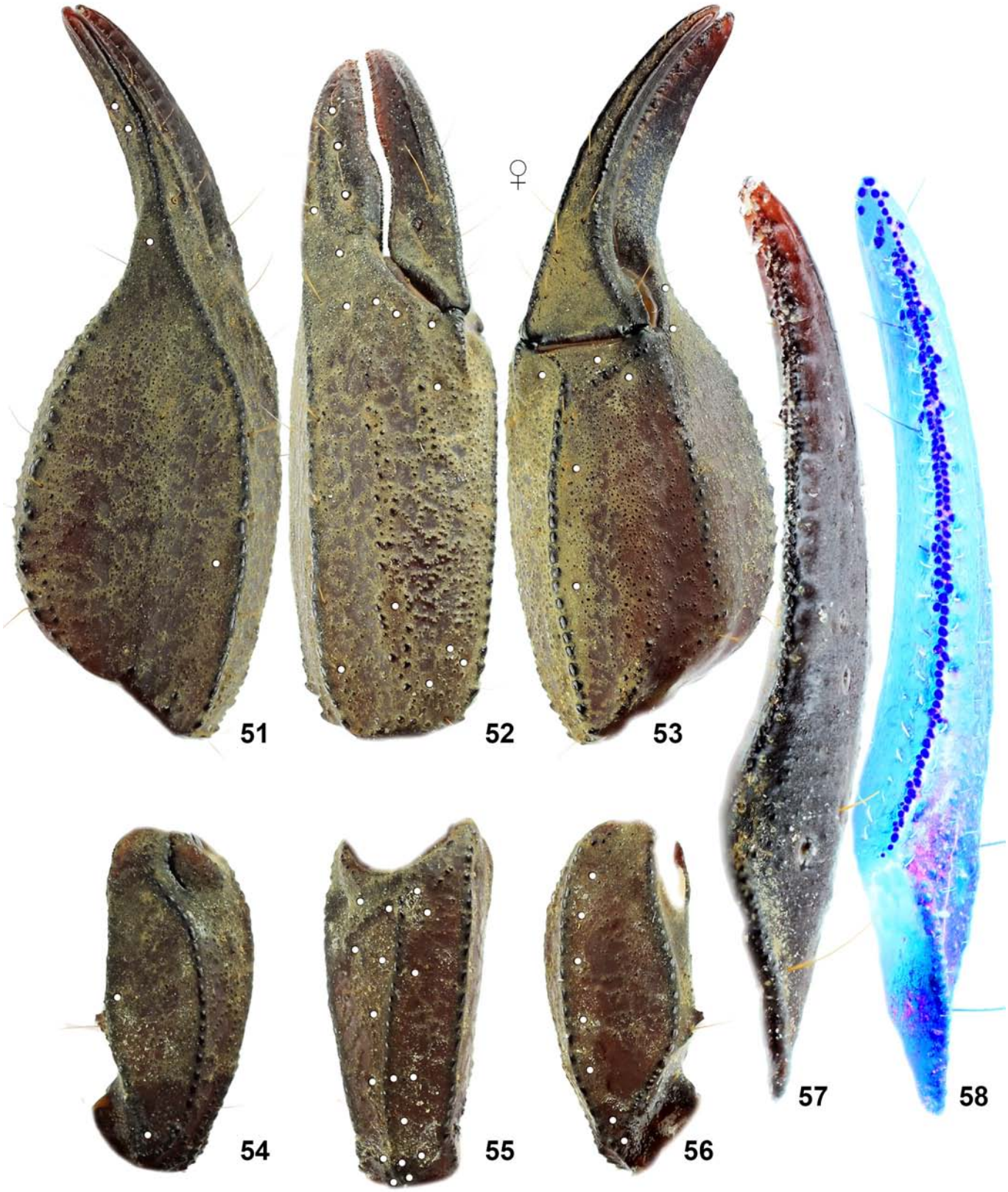


Figures 49–50. *Scorpiops harmsi* **sp. n.**, female holotype in dorsal (49) and ventral (50) views. Scale bar: 10 mm.

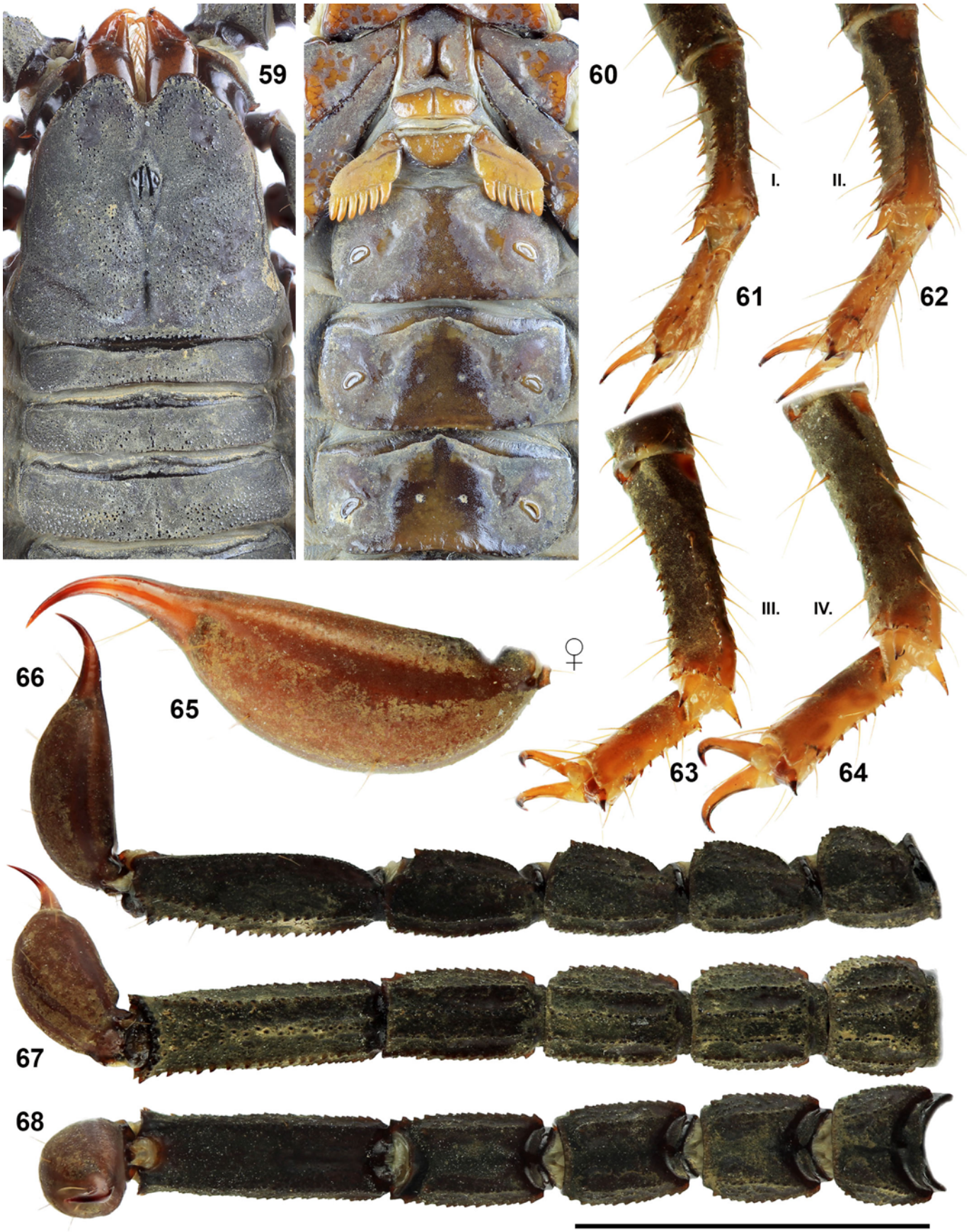
Etymology. The specific epithet honors David Hoferek (Czech Republic) for his contribution to understanding scorpions.

Diagnosis (♀). Total length 48–60 mm. Base color uniformly reddish brown to black, telson and tarsomere II of legs yellowish to reddish brown. Pectinal teeth number 4–6 in females, fulcra absent; marginal lamella I (basal) present, the remaining pectinal surface forming one compact unit. Patella of pedipalp with 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 7 ventral trichobothria. Chela of pedipalp with 4 ventral trichobothria located on ventral surface. Chelal trichobothrium Eb_3 located in lower half of external surface between trichobothria *Dt* and *Db*. Fingers of pedipalps undulate in females. Chela length to width ratio 2.9–3.1 in females. Pedipalp movable finger with ca 38 IAD, which form a second row, parallel to MD (62–68 in number); there are also 5 ID and 9–10 OD present. Tarsomere II of legs with 6–9 stout median ventral spines in a row and two other parallel spines. Telson bulbous and finely granulate, length to depth ratio 2.6–3 in females; annular ring present.

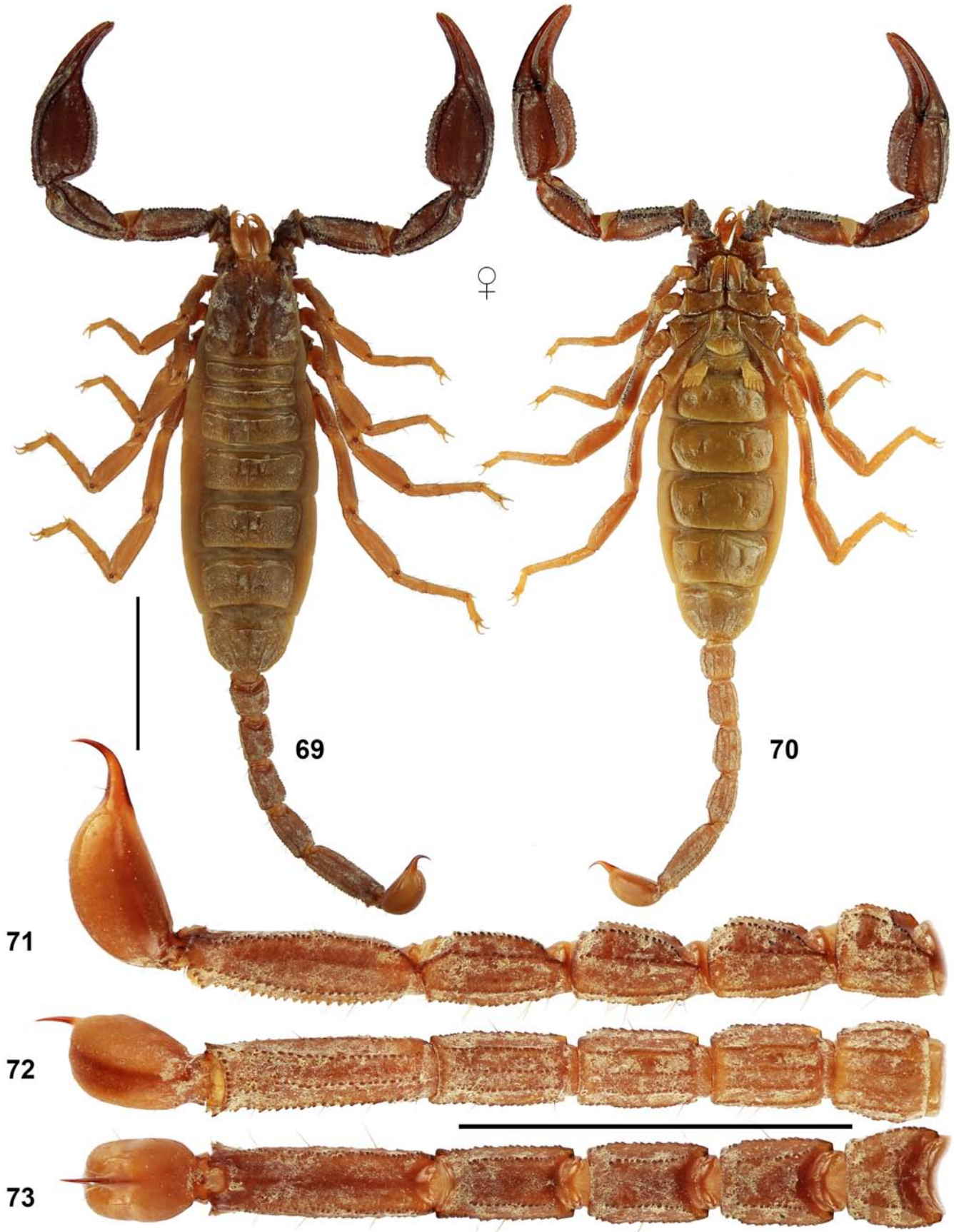
Description (♀). Total length 48–60 mm of females, male unknown. The habitus is shown in Figs. 69–70. For position and distribution of trichobothria of pedipalps see Figs. 74–80. Fingers of pedipalps are undulate in females (Fig. 75).



Figures 51–**58**. *Scorpiops harmsi* **sp**. **n**., female holotype, pedipalp segments. Chela dorsal (51), external (52) and ventral (53) views. Patella dorsal (54), external (55) and ventral (56) views. Movable finger dentition under white light (57) and UV fluorescence (58). Trichobothrial pattern is indicated by white circles.



Figures 59–68. *Scorpiops harmsi* **sp. n.**, female holotype. Carapace and tergites I–III (59), posterior coxosternal area and sternites III–V (60). Left legs I–IV, retrolateral aspect (61–64 respectively). Telson lateral (65). Metasoma and telson lateral (66), ventral (67), and dorsal (68) views.



Figures 69–**73**. *Scorpiops hofereki* **sp**. **n**., female holotype. Dorsal (69) and ventral (70) views. Metasoma and telson lateral (71), ventral (72), and dorsal (73) views. Scale bars: 10 mm (69–70, 71–73).

Figures 74–**82**. *Scorpiops hofereki* **sp**. **n**., female holotype, pedipalp segments. Chela dorsal (74), external (75) and ventral (76) views. Patella dorsal (77), external (78) and ventral (79) views. Femur and trochanter dorsal (80) and ventral (81) views. Movable finger dentition (82). Trichobothrial pattern is indicated by white circles.

Figures 83–92. *Scorpiops hofereki* **sp. n.**, female holotype. Carapace and tergites I–III (83), posterior coxosternal area and sternites III–IV (84). Right chelicera in dorsal (85) and ventral (86) views. Telson lateral (87). Pectine (88). Left legs I–IV, retrolateral aspect (89–92 respectively).

Coloration (Figs. 69–70). The base color is uniformly reddish brown (holotype) to black (paratype). The telson and tarsomere II of legs yellowish to reddish brown. Chelicerae are reddish black and reticulate.
Carapace and mesosoma (Figs. 83–84, 88). The entire carapace is covered with large and minute granules; carinae are absent but larger granules form two parallel rows in the anterior part of carapace. The anterior margin of the carapace is markedly depressed, convex in the middle. The carapace bears three lateral eyes, of which one can be reduced. The mesosoma is granulated, with one median carina. Tergite VII is pentacarinate. The sternites are finely granulated with two parallel furrows except sternite VII, which bears four sparsely granulate carinae. Pectinal teeth number 4–6 in females, fulcra are absent. The pectens have marginal lamella I (basal) present, the remainder of the pectinal surface forming one compact unit.
Metasoma and telson (Figs. 71–73, 87). The metasoma is very sparsely hirsute and granulated, with relatively large granules. Metasomal segment I with 10 carinae, II–IV with 8 carinae, and V with 5 carinae. The median lateral carinae of metasoma V are indicated by isolated granules that may coalesce into carinae. The dorsolateral carinae of segments III and IV are granulate with sharp granules, which are not posteriorly terminated with a pronounced tooth. The telson is bulbous and sparsely granulate, with annular ring present.
Pedipalps (Figs. 74–82). The pedipalps are very sparsely hirsute. The patella bears 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 7 ventral trichobothria. The chela bears 4 ventral trichobothria located on ventral surface. The femur and patella are granulated. The femur has 5 granulose carinae and the patella has 5 complete carinae with dorsal and ventral patellar spurs present but reduced. The manus dorsally bears fine, rounded reticulated granules. The external surface of the chela is covered by minute and larger sparse granules, which form another almost complete carina. The movable fingers with 9–10 IAD, parallel with MD (62–68 in number) and there are also 5 ID and 9–10 OD present.
Legs (Figs. 89–92). The tibia and tarsomeres of legs with several setae not arranged into bristlecombs on dorsal surfaces but with rows of spines on dorsolateral and ventrolateral surface. Tarsomere II of legs I–IV with 6–9 stout median ventral spines in a row and two other parallel spines. The femur bears 3–4 and patella, 4–5 incomplete carinae; both femur and patella are finely granulated.
Measurements. See Table 1.

Affinities. The described features distinguish *S. hofereki* **sp. n.** from all other species of the genus. The combination of four characters (chelal trichobothrium Eb_3 located in proximal half of external surface between trichobothria *Dt* and *Db*; total length over 45 mm; fingers of pedipalps undulate in females; chela length to width ratio 2.9–3.1 in females; and patella of pedipalp with 7 ventral trichobothria) is unique in the entire genus *Scorpiops*.

Distribution. Pakistan (Fig. 240).

Scorpiops kejvali sp. n.

(Figures 93–131, 240, Table 2)
http://zoobank.org/urn:lsid:zoobank.org:act:EB52FA43-3FC9-41D3-B0B0-3349670C0F70

Type locality and type repository. India, Uttarakhand (formerly Uttaranchal) State, ca 55 km of Bageshwar (29.84°N 79.73°E), E of Munsyiari, 2200-2400 m a. s. l.; FKCP.

Type material. **India**, Uttarakhand (formerly Uttaranchal) State, ca 55 km E of Bageshwar (29.84°N 79.73°E), E of Munsyiari, 2200-2400 m a. s. l., 6-9 July 2003, 1♂(holotype), leg. Z. Kejval & M. Trýzna; ca 30 km E of Bageshwar, SE of Dhakuri vill., 2600-2800 m a. s. l., 25-26 June 2003, 5♀2juvs(♂♀) (paratypes), leg. Z. Kejval & M. Trýzna, FKCP.

Etymology. The species epithet is a patronym honoring a Czech entomologist Zdeněk Kejval, the collector of the types of the new species.

Diagnosis (♂♀). Total length 37 mm (male) to 52 mm (female). Base color uniformly reddish brown to black, telson and tarsomere II of legs reddish brown. Pectinal teeth number 7 in male, 5–6 in females, fulcra absent. Marginal lamella I (basal) present, the remainder of the pectinal surface forming one compact unit. Patella of pedipalp with 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 7 ventral trichobothria. Chela of pedipalp with 4 ventral trichobothria located on ventral surface. Chelal trichobothrium Eb_3 is located in proximal half of external surface between trichobothria *Dt* and *Db*. Fingers of pedipalps slightly undulate in both sexes. Chela length to width ratio 3.15 in male, 2.64 in females. Pedipalp movable finger with 7–9 larger and 24–26 smaller IAD, which form a second row, parallel to MD (60–68 in number); there are also 4 ID and 8–10 OD present. Tarsomere II of legs with 8–9 stout median ventral spines in a row and two other parallel spines. Metasoma I with 10, and metasoma II–IV with 8 carinae. Telson elongate and sparsely granulate, length to depth ratio 3.16 in male and 3.05 in females; annular ring developed in both sexes.

Description (♂♀). Total length 37 mm (male) to 52 mm (female). The habitus is shown in Figs. 93–96. For position and distribution of trichobothria of pedipalps see Figs. 97a–102a. Sexual dimorphism minor: adult males have relatively larger pectens and slightly elongate pedipalp chela; fingers of pedipalps are very slightly undulate in both sexes (Figs. 98 and 106).
Coloration (Figs. 93–96). The base color is uniformly reddish brown to black, telson and tarsomere II of legs reddish brown to black, sternites obviously lighter, reddish brown. Chelicerae are yellowish brown and reticulate, fingers black.
Carapace and mesosoma (Figs. 124–127). The entire carapace is covered with large and minute granules; carinae are absent. The anterior margin of the carapace is markedly depressed, convex in the middle. The carapace bears three

Dimensions (MM)		*S. kejvali* **sp. n.** ♂ **holotype**	*S. kejvali* **sp. n.** ♀ **paratype**	*S. tryznai* **sp. n.** ♀ **holotype**	*S. wrzecionkoi* **sp. n.** ♀ **holotype**
Carapace	L / W	5.89 / 5.32	6.99 / 7.42	8.34 / 7.43	7.42 / 6.53
Mesosoma	L	11.52	19.00	24.27	18.03
Tergite VII	L / W	2.55 / 4.28	3.02 / 6.20	4.59 / 6.21	3.56 / 5.37
Metasoma + telson	L	19.52	24.51	28.19	22.87
Segment I	L / W / D	2.09 / 2.42 / 2.20	2.59 / 2.86 / 2.47	3.06 / 3.03 / 2.42	2.48 / 2.46 / 2.43
Segment II	L / W / D	2.35 / 2.12 / 2.02	2.92 / 2.67 / 2.31	3.49 / 2.67 / 2.25	2.67 / 2.12 / 2.31
Segment III	L / W / D	2.55 / 1.86 / 1.95	3.20 / 2.47 / 2.26	3.87 / 2.48 / 2.27	2.89 / 2.09 / 2.23
Segment IV	L / W / D	2.97 / 1.78 / 1.81	3.55 / 2.29 / 2.10	4.12 / 2.28 / 2.17	3.37 / 1.98 / 2.01
Segment V	L / W / D	4.60 / 1.61 / 1.68	5.84 / 2.02 / 2.02	6.65 / 2.10 / 1.91	5.72 / 1.86 / 1.79
Telson	L / W / D	4.96 / 1.67 / 1.57	6.41 / 2.10 / 2.05	7.00 / 2.55 / 2.46	5.74 / 2.27 / 2.23
Pedipalp	L	20.33	24.63	29.29	24.60
Femur	L / W	4.97 / 2.21	6.14 / 2.34	7.44 / 2.89	6.12 / 2.54
Patella	L / W	5.10 / 2.20	6.00 / 2.49	7.23 / 3.35	5.68 / 2.59
Chela	L	10.26	12.49	14.62	12.80
Manus	W / D	3.26 / 2.56	4.73 / 3.62	4.67 / 3.77	4.68 / 3.58
Movable finger	L	5.06	6.11	7.19	6.96
Total	**L**	**36.93**	**50.5**	**60.80**	**48.32**

Table 2. Comparative measurements of adults of *Scorpiops kejvali* **sp. n.**, *S. tryznai* **sp. n.** and *S. wrzecionkoi* **sp. n.** Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (D).

lateral eyes. The mesosoma is granulated, with one median carina. Tergite VII is pentacarinate. The sternites are smooth to finely granulated with two parallel furrows except sternite VII, which bears four sparsely granulate carina. Pectinal teeth number 7 in male and 5–6 in females, fulcra are absent. The marginal lamella I (basal) is present, the remainder of the pectinal surface forming one compact unit.

Metasoma and telson (Figs. 116–123). The metasoma is sparsely hirsute and granulated, with sparse, relatively large granules. Metasomal segment I with 10 carinae, II–IV with 8 carinae, and V with 5 carinae. The median lateral carinae of metasoma V are indicated by isolated granules that may coalesce into carinae. The dorsolateral carinae of segments III and IV posteriorly are not terminated in a pronounced tooth. The telson is elongate and sparsely granulate, with annular ring developed in both sexes.

Pedipalps (Figs. 97–115). The pedipalps are very sparsely hirsute. The patella bears 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 7 ventral trichobothria. The chela bears 4 ventral trichobothria located on the ventral surface. The femur and patella are granulated. The femur has 5 granulose carinae, and the patella has 5 carinae with reduced dorsal and ventral patellar spurs. The manus dorsally bears rounded granules of different sizes. The external surface of the chela is covered by minute granules and bears an almost complete median carina composed of larger, sparse granules. The movable fingers with 7–9 larger and 24–26 smaller IAD, which form a second row, parallel to MD (60–68 in number). There are also 4 ID and 8–10 OD present.

Legs (Figs. 128–131). The tibia and tarsomeres of legs with several setae not arranged into bristlecombs on dorsal surfaces but with rows of spines on dorsolateral and ventrolateral surfaces. Tarsomere II of legs I–IV with 8–9 stout median ventral spines in a row and two other parallel spines. The femur bears 3–4 and patella, 4–5 carinae; both femur and patella are granulated.

Measurements. See Table 2.

Affinities. The described features distinguish *S. kejvali* **sp. n.** from all other species of the genus. The combination of five characters (chelal trichobothrium Eb_3 located in proximal half of external surface between trichobothria *Dt* and *Db*; fingers of pedipalps slightly undulate in both sexes; pedipalp movable finger with 33–45 IAD; chela length to width ratio 2.6 in females; and patella of pedipalp with 7 ventral trichobothria), is unique in the entire genus *Scorpiops*.

Distribution. India, Uttarakhand (formerly Uttaranchal) State (Fig. 240).

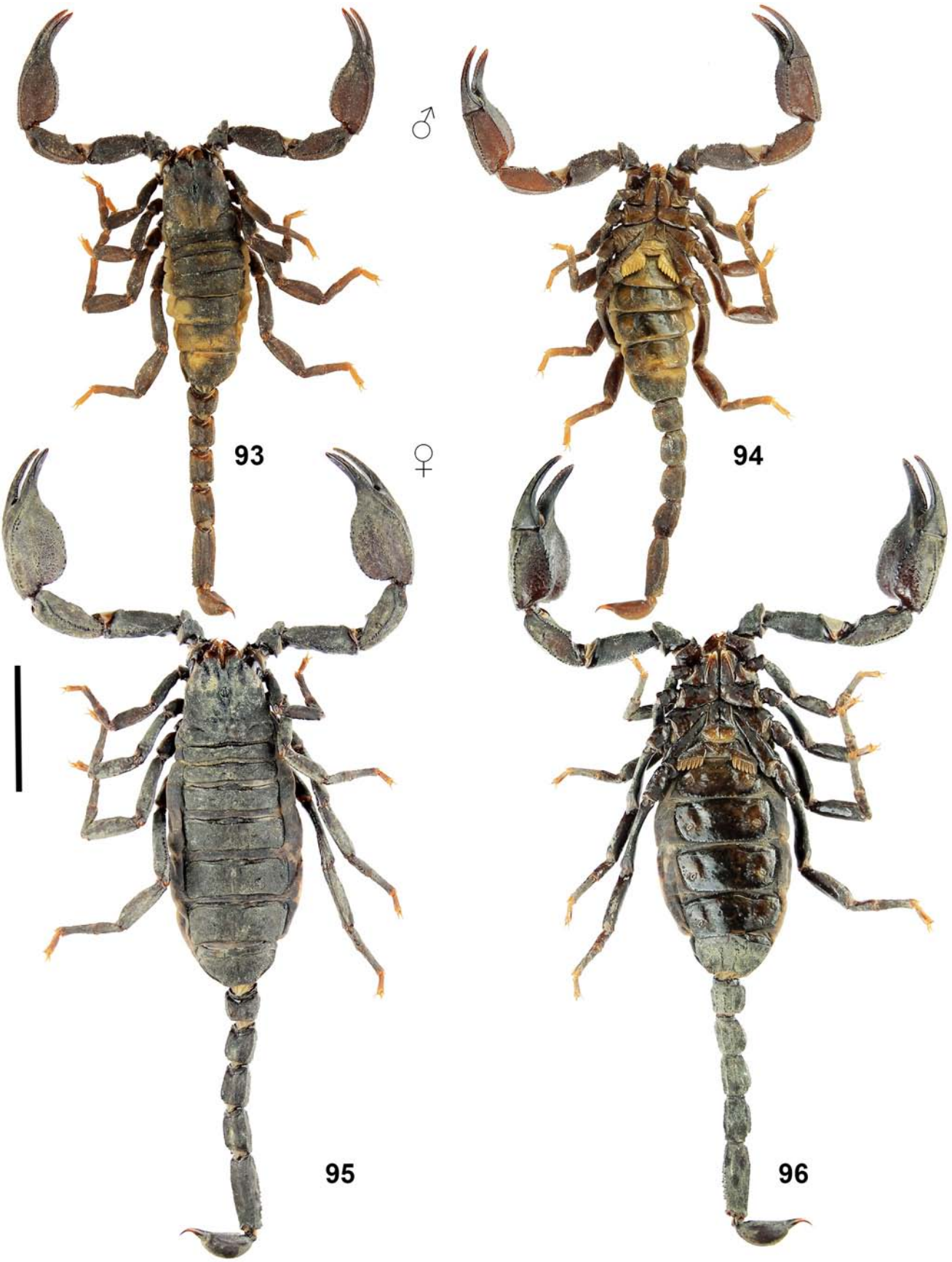
Scorpiops tryznai **sp. n.**

(Figures 132–155, 240, Table 2)

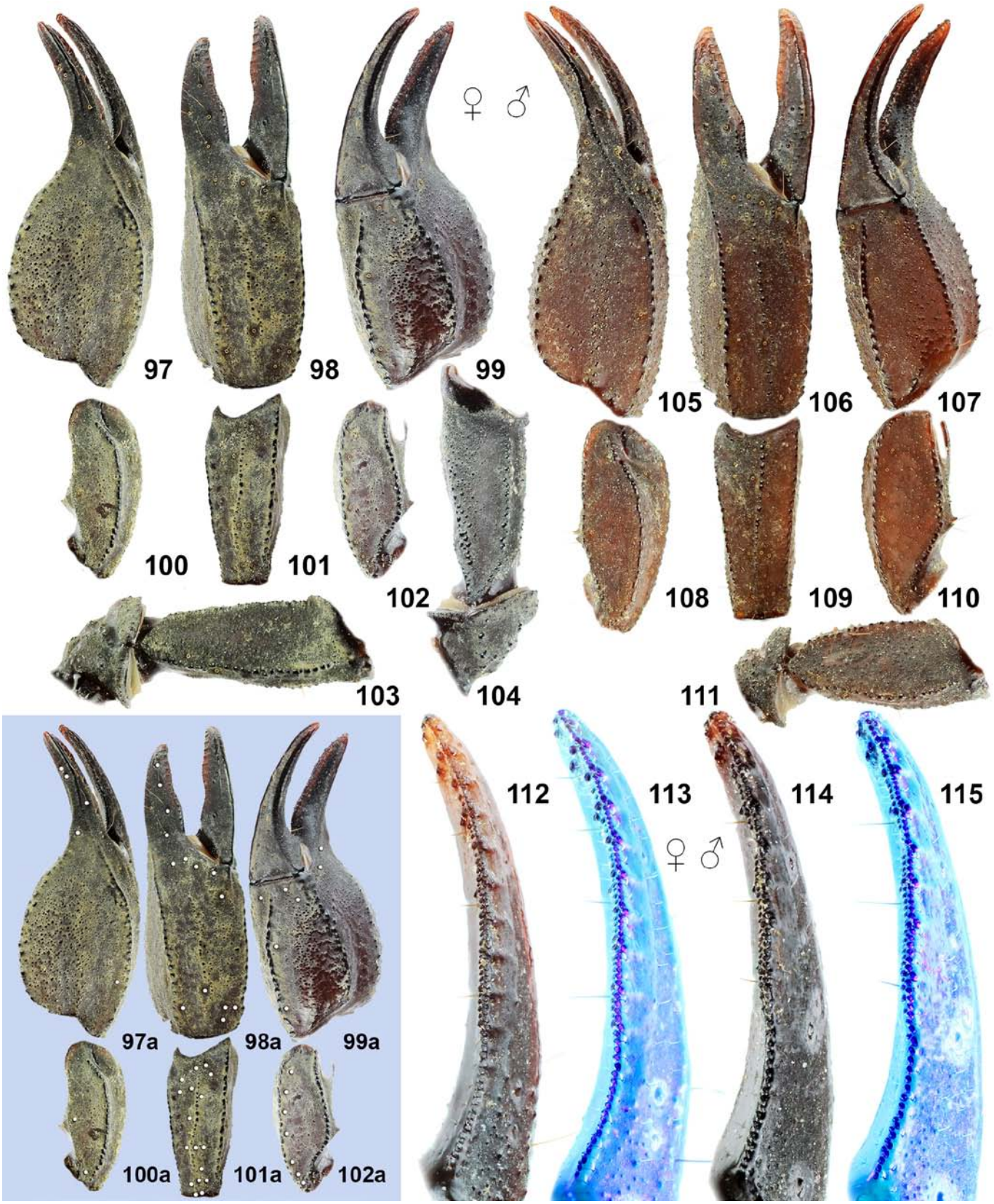
http://zoobank.org/urn:lsid:zoobank.org:act:2B7CA65D-8002-4E35-9740-7A2E1D4B980D

Type locality and type repository. India, Uttarakhand (formerly Uttaranchal) State, ca 15 km NE of Mussoorie, Dhanaulti (30.40°N 78.19°E) env., 2250 m a.s.l.; FKCP.

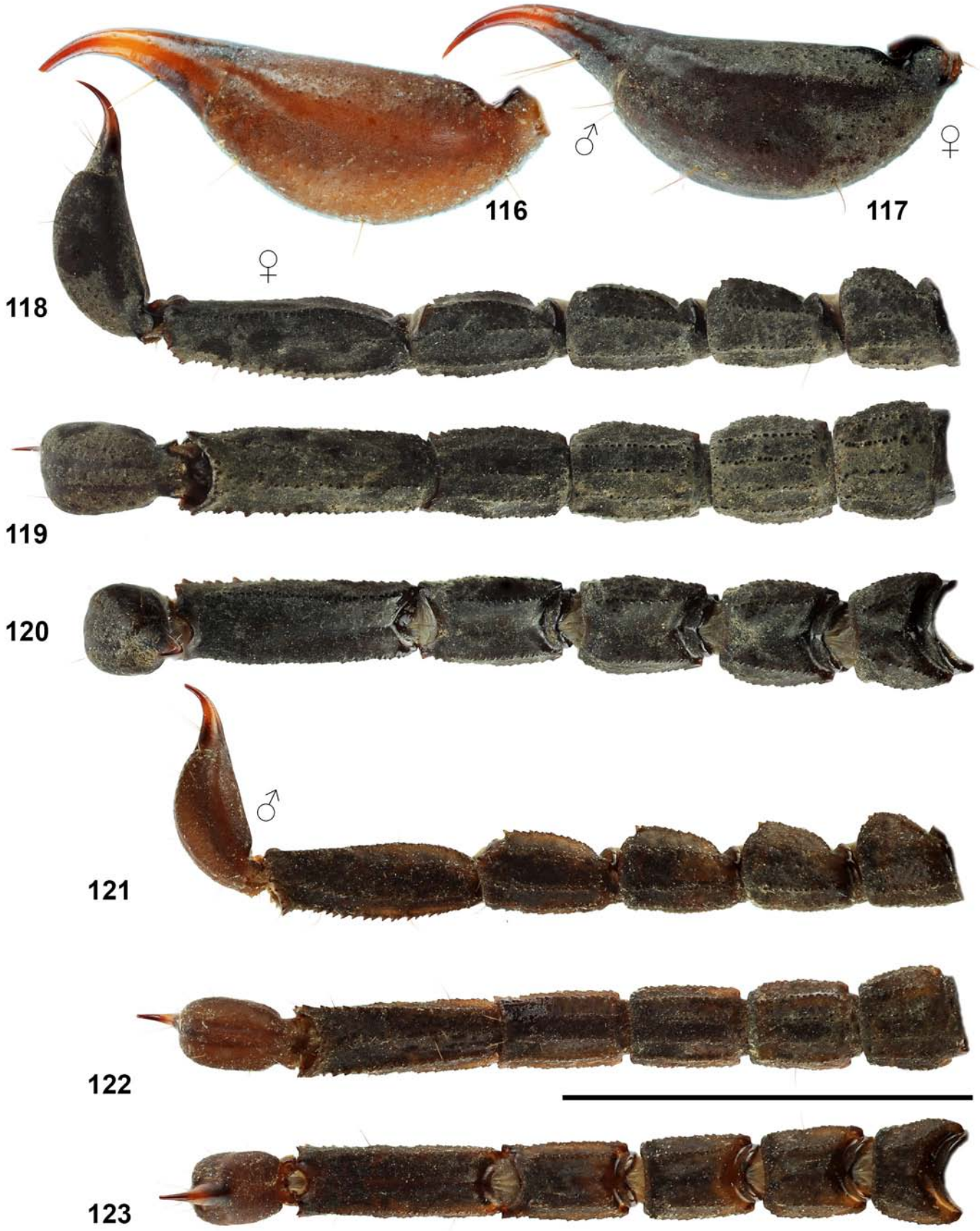
Type material. **India**, Uttarakhand (formerly Uttaranchal) State, ca 15 km NE of Mussoorie, Dhanaulti (30.40°N 78.19°E) env., 2250 m a. s. l., 1 August 2003, 1♀ (holotype), leg. Z. Kejval & M. Trýzna.



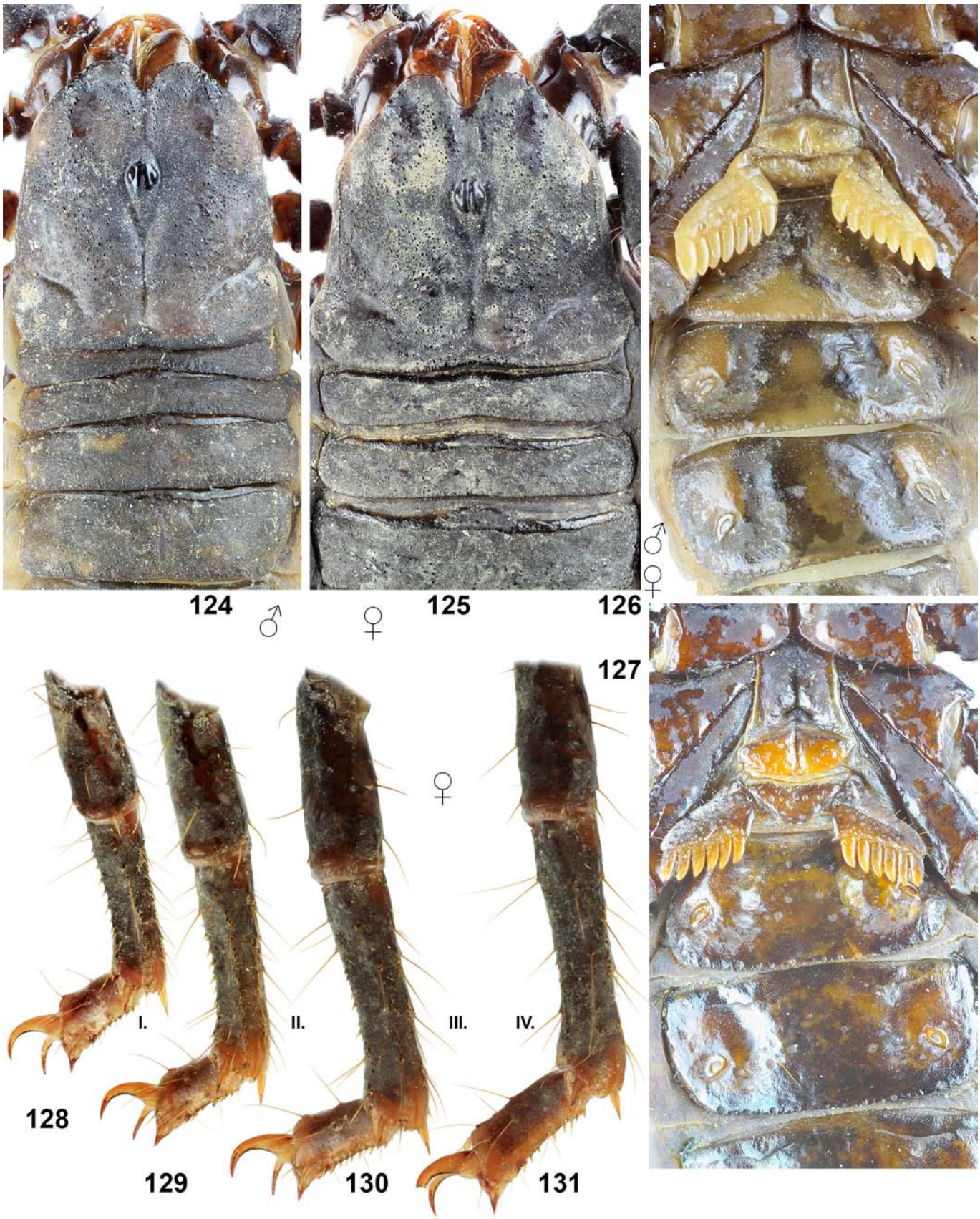
Figures 93–**96**: *Scorpiops kejvali* **sp**. **n**. **Figures 93**–**94**. Male holotype in dorsal (93) and ventral (94) views. **Figures 95**–**96**. Female paratype in dorsal (95) and ventral (96) views. Scale bar: 10 mm.



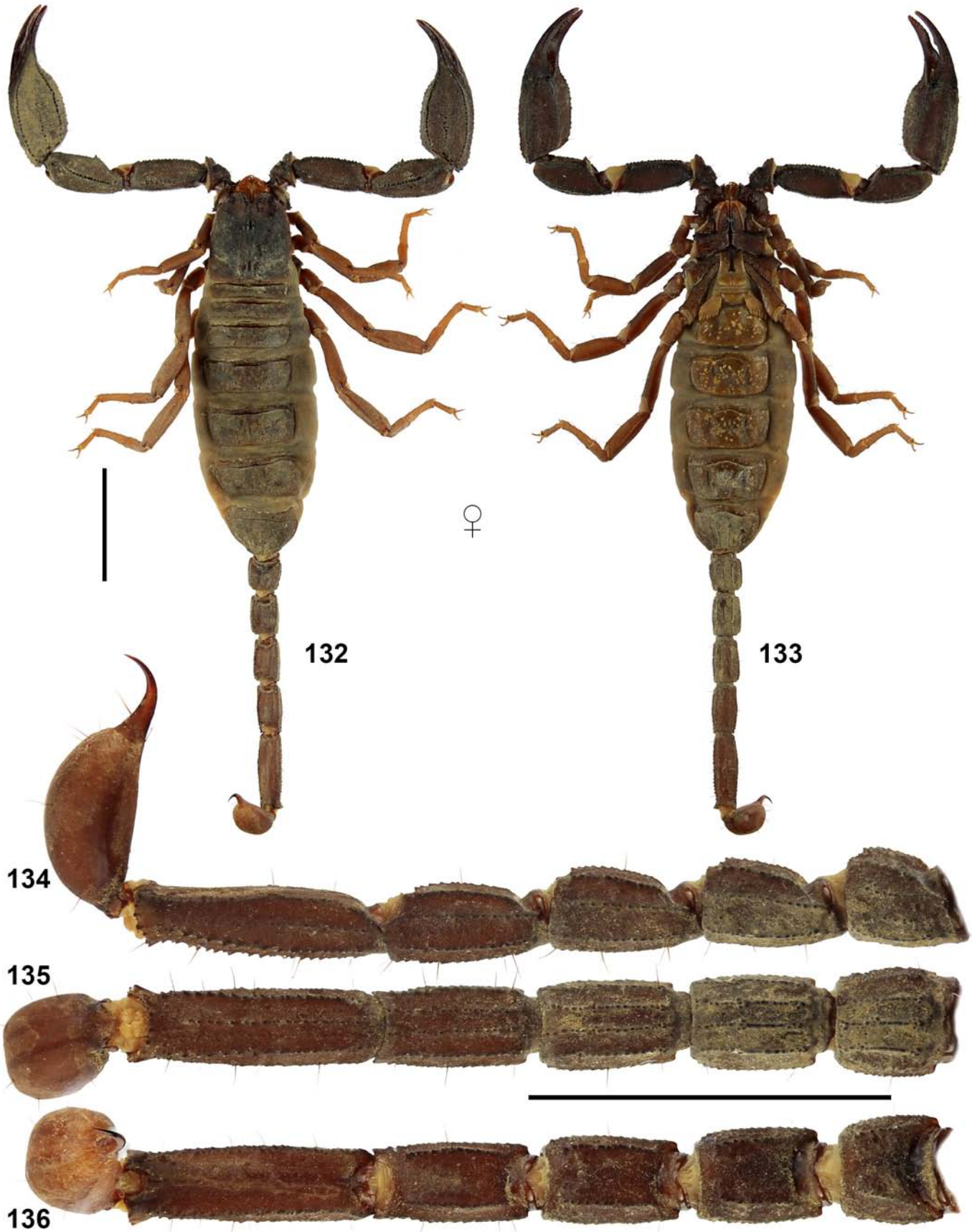
Figures 97–115. *Scorpiops kejvali* **sp. n.**, pedipalp segments of female paratype (97–104, 112–113) and male holotype (105–111, 114–115). Chela dorsal (97, 105), external (98, 106) and ventral (99, 107) views. Patella dorsal (100, 108), external (101, 109) and ventral (102, 110) views. Femur and trochanter dorsal (103, 111) and ventral (104). Movable finger dentition under white light (112, 114) and UV fluorescence (113, 115). Trichobothrial pattern is indicated by white circles (97a–102a).



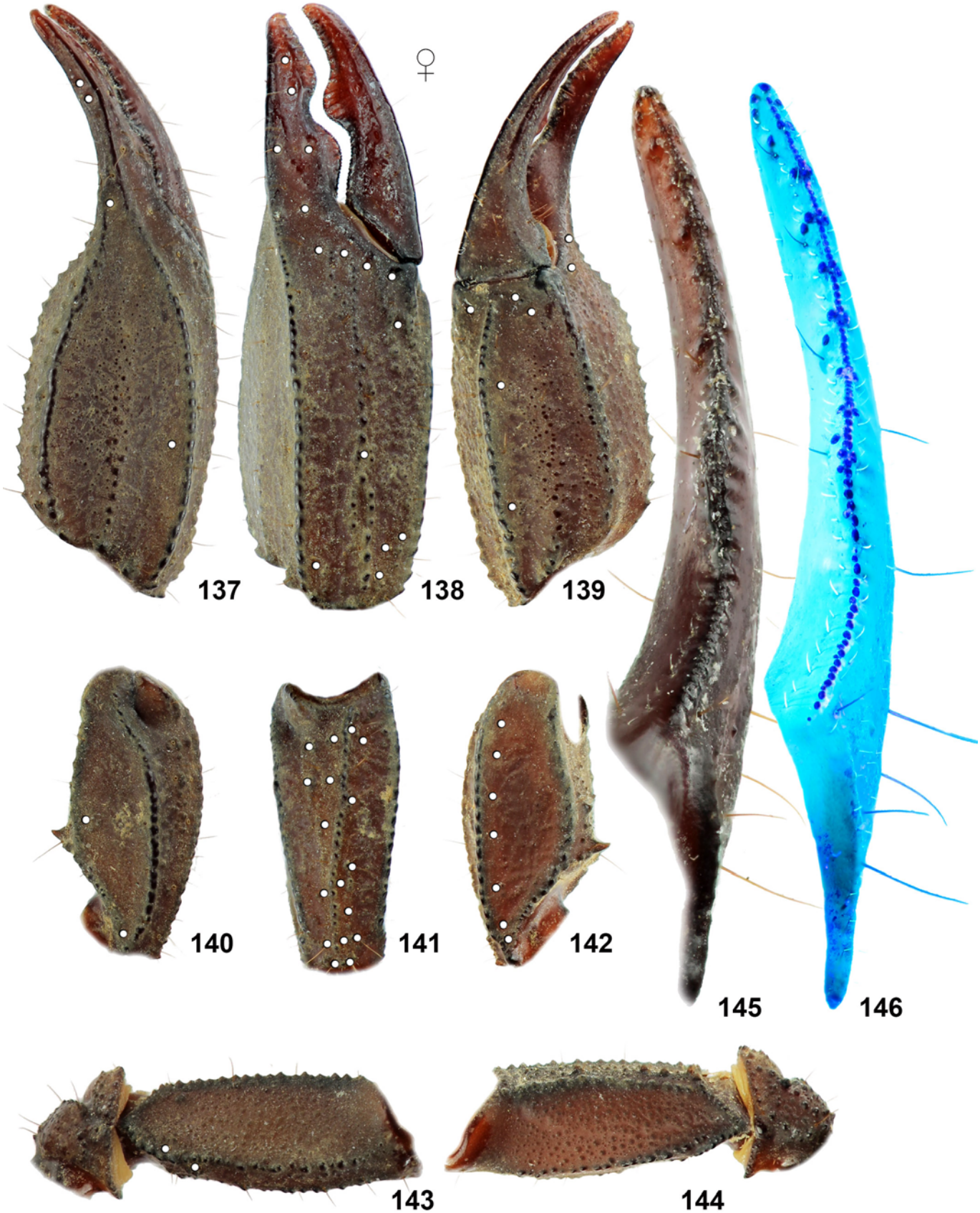
Figures 116–**123**: *Scorpiops kejvali* **sp**. **n**., metasoma and telson. **Figures 117**–**120**. Female paratype, telson lateral (117), metasoma and telson lateral (118), ventral (119), and dorsal (120) views. **Figures 116**, **121**–**123**. Male holotype, telson lateral (116), metasoma and telson lateral (121), ventral (122), and dorsal (123) views. Scale bar: 10 mm (118–123).



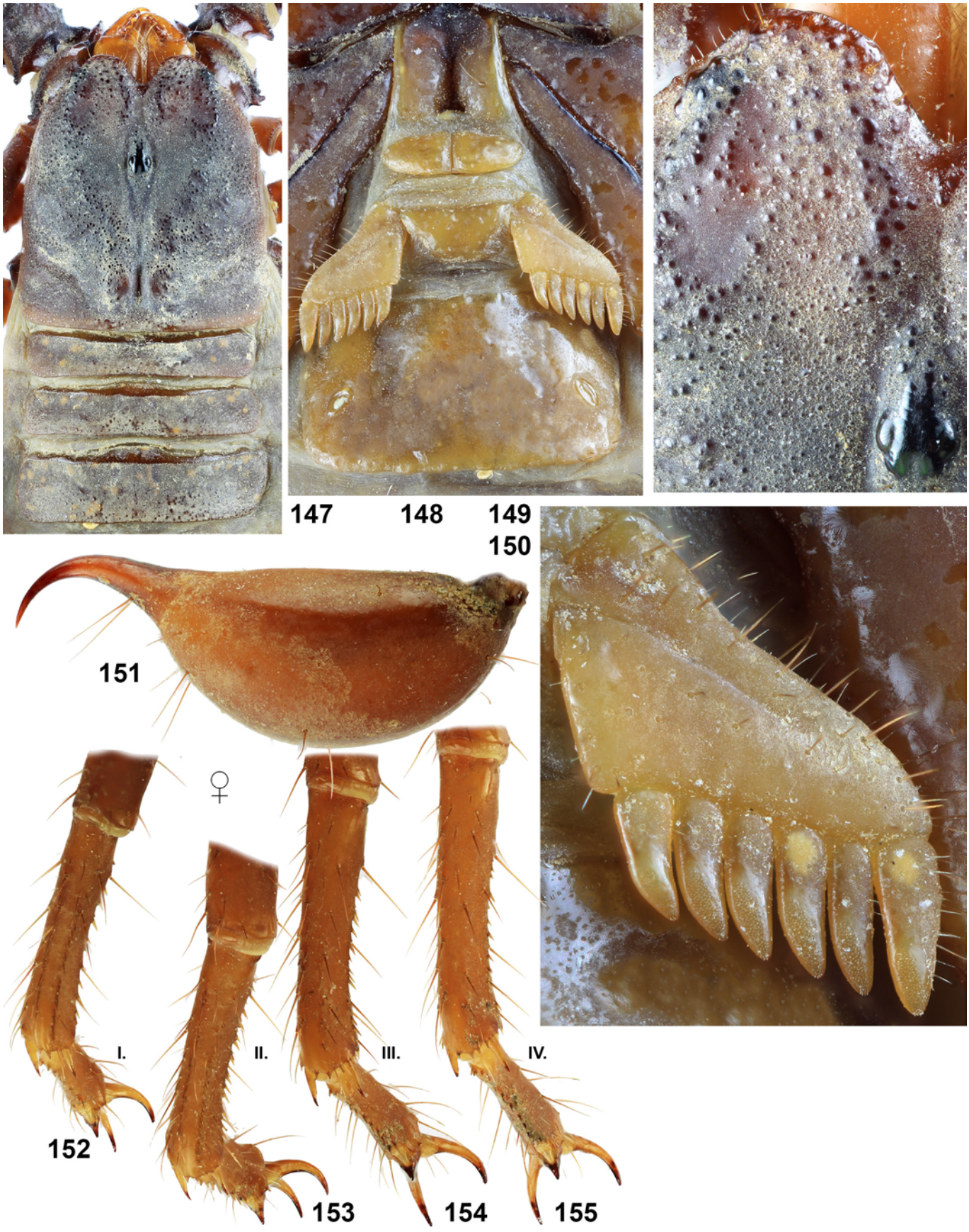
Figures 124–**131**: *Scorpiops kejvali* **sp**. **n**. **Figures 124**, **126**. Male holotype, carapace and tergites I–IV (124), posterior coxosternal area and sternites III–V (126). **Figures 125**, **127**–**131**. Female paratype, carapace and tergites I–III (125) and posterior coxosternal area and sternites III–IV (127), left legs I–IV, retrolateral aspect (128–131 respectively).



Figures 132–**136**. *Scorpiops tryznai* **sp**. **n**., female holotype. Dorsal (132) and ventral (133) views. Metasoma and telson lateral (134), ventral (135), and dorsal (136) views. Scale bars: 10 mm (132–133, 134–136).



Figures 137–146. *Scorpiops tryznai* **sp. n.**, female holotype, pedipalp segments. Chela dorsal (137), external (138) and ventral (139) views. Patella dorsal (140), external (141) and ventral (142) views. Femur and trochanter dorsal (143) and ventral (144) views. Movable finger dentition under white light (145) and UV fluorescence (146). Trichobothrial pattern is indicated by white circles.



Figures 147–155. *Scorpiops tryznai* **sp. n.**, female holotype. Carapace and tergites I–III (147), posterior coxosternal area and sternite III (148). Median and left lateral eyes (149). Pectine (150). Telson lateral (151). Right legs I–IV, retrolateral aspect (152–155 respectively).

Etymology. The species epithet is a patronym honoring a Czech entomologist Miloš Trýzna, one of the collectors of holotype of the new species.

Diagnosis (♀). Total length 61 mm. Base color uniformly reddish black to black, telson and legs reddish brown. Pectinal teeth number 6 in female, fulcra absent; a pecten forms one compact unit with an incomplete furrow between places for marginal and middle lamellae. Patella of pedipalp with 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 7 ventral trichobothria. Chela of pedipalp with 4 ventral trichobothria located on ventral surface. Chelal trichobothrium Eb_3 is located in proximal half of external surface in line with *Dt*. Fingers of pedipalps flexed in female. Chela length to width ratio 3.13 in female. Pedipalp movable finger with 9 IAD, ca 74 MD, 4 ID and 11–13 OD present. Tarsomere II of legs with 7–8 stout median ventral spines in a row and two other parallel spines. Telson rather bulbous and smooth, length to depth ratio 2.85 in female; annular ring present.

Description (♀). Total length 61 mm of female holotype, male unknown. The habitus is shown in Figs. 132–133. For position and distribution of trichobothria of pedipalps see Figs. 137–143. Fingers of pedipalps are flexed in female (Fig. 138).

Coloration (Figs. 132–133). The base color is uniformly reddish brown to black. The telson and legs are reddish brown but lighter than mesosoma. Chelicerae are reddish black and reticulate.

Carapace and mesosoma (Figs. 147–150). The entire carapace is covered with large and minute granules; carinae are absent. The anterior margin of the carapace is markedly depressed, convex in the middle. The carapace bears three lateral eyes. The mesosoma is granulated, with one median carina. Tergite VII is pentacarinate. The sternites are smooth with two parallel furrows except sternite VII, which bears four sparsely granulate carina. Pectinal teeth number 6 in female, fulcra are absent. A pecten forms one compact unit with an incomplete furrow between places for marginal and middle lamellae.

Metasoma and telson (Figs. 134–136, 151). The metasoma is very sparsely hirsute and granulated, with relatively large granules. Metasomal segment I with 10 carinae, II–IV with 8 carinae, and V with 5 carinae. The median lateral carinae of metasoma V are indicated by isolated granules that may coalesce into carinae. The dorsolateral carinae of segments III and IV are granulate with sharp granules, which are not posteriorly terminated with a pronounced tooth. The telson is rather bulbous and smooth, with annular ring present.

Pedipalps (Figs. 137–146). The pedipalps are very sparsely hirsute. The patella bears 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 7 ventral trichobothria. The chela bears 4 ventral trichobothria located on the ventral surface. The femur and patella are granulated. The femur has 5 granulose carinae and the patella has 5 complete carinae with dorsal and ventral patellar spurs present. The manus dorsally bears granules, which are in the central part replaced by large granules forming a longitudinal irregular incomplete carina. The external surface of the chela is covered by minute and larger sparse granules, which form another complete median carina. The movable fingers with 9 IAD, ca 74 MD; there are also 4 ID and 11–13 OD present.

Legs (Figs. 152–155). The tibia and tarsomeres of legs with several setae not arranged into bristlecombs on dorsal surfaces but with rows of spines on dorsolateral and ventrolateral surface. Tarsomere II of legs I–IV with 7–8 stout median ventral spines in a row and two other parallel spines. The femur bears 3–4 and patella, 4–5 incomplete carinae; both femur and patella are finely granulated.

Measurements. See Table 2.

Affinities. The described features distinguish *S. tryznai* **sp**. **n**. from all other species of the genus. *S. tryznai* **sp**. **n**. is very similar to *S. vonwicki* Birula, 1913. It is possible to differentiate these two species according to pecten morphology. *S. vonwicki* has fulcra present (*S. tryznai* **sp**. **n**. has fulcra absent). *S vonwicki* has separate, formed marginal lamellae I and III; marginal lamella II is not defined but forms a single compact unit with middle lamella. In *S. tryznai* **sp**. **n**., a pecten forms one compact unit with an incomplete furrow between places for marginal and middle lamellae. Trichobothria *Dt* and Eb_3 are located more basally in *S. vonwicki* (Figs. 161–162 versus 137–138). Also, localities of these two species are far apart.

Distribution. India, Uttarakhand (formerly Uttaranchal) State (Fig. 240).

Scorpiops vonwicki Birula, 1913 **stat**. **n**.

(Figures 156–174, 240, Table 3)

Scorpiops petersi von-wicki Birula, 1913: 417–418; Vachon, 1980: 150.
Scorpiops petersii vonwicki: Fet, 2000: 494.
Scorpiops petersii (in part): Kovařík, 2000: 192–194.

Type locality and type repository. India, "Assam, Aboren-Gebirge" [now Arunachal Pradesh State, Abor Hills, ca. 28.46°N 94.54°E; see Comments]; ZISP.

Type material. **India**, "Assam, Aboren-Gebirge (Dr. Williamson 1911 leg.). 1912, S. N. von-Wick ded." [see Comments]; 1♀ (holotype), ZISP No. 1054.

Diagnosis (♀ holotype). Total length 52 mm. Base color uniformly reddish brown, telson and legs lighter. Pectinal teeth number 5–6 in female, fulcra present; marginal lamellae I (basal) and III present, marginal lamella II is not defined, connected with middle lamella in one compact unit. Patella of pedipalp with 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, and 4 *et*) external and 7 ventral trichobothria. Chela of pedipalp with 4 ventral trichobothria located on ventral surface. Chelal

Dimensions (MM)		*S. vonwicki* ♀ holotype	*S. yagmuri* sp. n. ♂ holotype	*S. yagmuri* sp. n. ♀ paratype	*S. zubairi* sp. n. ♂ holotype	*S. zubairi* sp. n. ♀ paratype
Carapace	L / W	6.74 / 6.28	7.33 / 7.30	8.03 / 7.75	5.54 / 5.72	6.26 / 6.86
Mesosoma	L	18.35	14.82	14.30	9.67	10.27
Tergite VII	L / W	5.58 / 3.35	2.95 / 4.60	3.01 / 5.17	2.16 / 4.96	2.82 / 6.10
Metasoma + telson	L	26.46	21.01	23.91	21.62	23.49
Segment I	L / W / D	2.76 / 2.62 / 2.15	2.16 / 1.88 / 1.87	2.51 / 2.58 / 2.25	2.16 / 2.65 / 2.47	2.46 / 3.26 / 2.72
Segment II	L / W / D	3.08 / 2.28 / 1.94	2.13 / 1.93 / 1.87	2.63 / 2.29 / 2.11	2.70 / 2.47 / 2.35	2.88 / 2.93 / 2.39
Segment III	L / W / D	3.64 / 2.20 / 1.92	2.62 / 1.79 / 1.83	2.95 / 1.94 / 2.01	2.90 / 2.41 / 2.23	3.18 / 2.76 / 2.51
Segment IV	L / W / D	4.15 / 2.04 / 1.79	3.05 / 1.63 / 1.81	3.42 / 1.94 / 2.05	3.14 / 2.30 / 2.19	3.47 / 2.48 / 2.50
Segment V	L / W / D	6.48 / 1.86 / 1.90	5.05 / 1.54 / 1.73	5.75 / 1.81 / 1.94	5.32 / 2.11 / 2.01	5.52 / 2.29 / 2.07
Telson	L / W / D	6.35 / 1.99 / 2.12	6.00 / 1.75 / 1.70	6.65 / 2.21 / 1.92	5.40 / 2.55 / 2.34	5.98 / 2.65 / 2.20
Pedipalp	L	25.63	29.15	32.84	18.25	20.69
Femur	L / W	6.36 / 2.38	7.94 / 3.02	9.11 / 3.39	4.16 / 1.92	4.82 / 2.27
Patella	L / W	6.27 / 2.70	6.79 / 3.04	7.80 / 3.23	4.77 / 2.19	5.35 / 2.56
Chela	L	13.00	14.42	15.93	9.32	10.52
Manus	W / D	4.45 / 3.62	4.04 / 2.77	4.69 / 3.18	4.44 / 3.47	4.92 / 3.84
Movable finger	L	5.67	6.95	6.89	4.89	5.56
Total	**L**	**51.55**	**43.16**	**46.24**	**36.83**	**40.02**

Table 3. Comparative measurements of adults of *Scorpiops vonwicki* Birula, 1913, *S. yagmuri* **sp. n.**, and *S. zubairi* **sp. n.** Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (D).

trichobothrium Eb_3 is located basally in proximal half of external surface at the same level as *Dt*. Fingers of pedipalps flexed in female. Chela length to width ratio 2.92 in female. Pedipalp movable finger with ca 10 IAD, ca 65 MD, 4 ID and 11–13 OD present. Tarsomere II of legs with 7–8 stout median ventral spines in a row and two other parallel spines. Telson rather elongate and smooth, length to depth ratio 3 in female; annular ring present.

Comments. (Victor Fet, pers comm): This taxon was described based on a single holotype female; no other specimens are known. The holotype was brought to St. Petersburg by S. N. [Sergei Nikolaevich] von Wick [Russ. Сергей Николаевич фон Вик], a Russian zoologist of German extraction who explored India and Africa before World War I. Von Wick collected numerous zoological specimens for ZISP (then the Imperial Zoological Museum); a detailed travelogue of his expedition to Assam in January-March 1912 was published (von Wick, 1913).

However, according to Birula (1913: 417; information absent from the specimen label, see under Figs. 156–157), the holotype female of *Scorpiops petersi von-wicki* was collected not by von Wick in 1912 but by a "Dr. Williamson in 1911 in the mountains of the Abors" (in Birula's German text, "Aboren-Gebirge"). Indeed, von Wick (1913: XV) specifically mentioned several animal specimens he received as a gift in Sadiya (where von Wick's expedition stayed on 11-15 February 1912) from a British political official "who said that those were collected by Dr. Williamson in 1911 in the mountains of the Abors" (our translation from Russian).

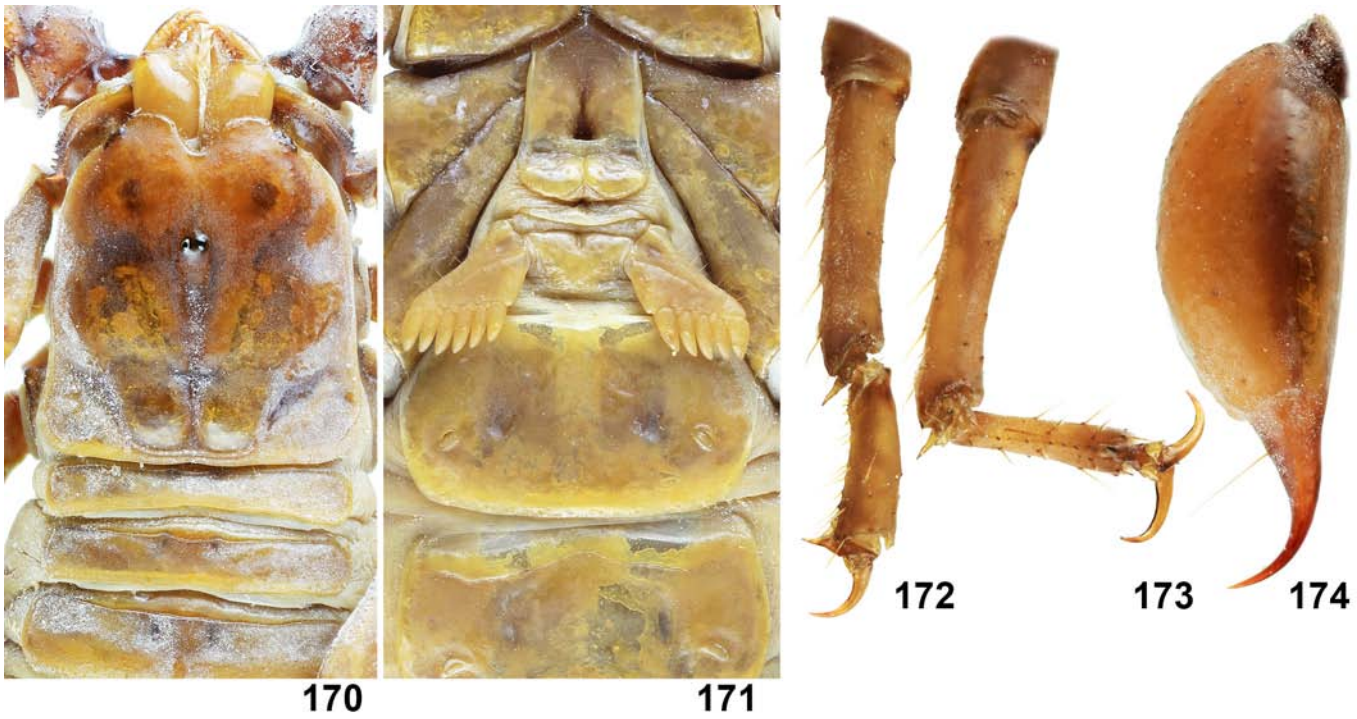
Sadiya (27.83°N 95.67°E), a town on the Brahmaputra River (123 m a. s. l.) was the extreme northeastern frontier station of British Raj. It is most likely that the original collector was a former British Political Officer (not a "Doctor"), also stationed at Sadiya, Noel Williamson, infamously murdered by the locals in the Abor Hills in March 1911. Later same year, the British authorities sent the punitive Abor Expeditionary Force to enforce jurisdiction of this frontier.

Stanley W. Kemp (1882–1945), then of the Indian Museum (Calcutta) and his collector R. Hodgart accompanied the Abor Expeditionary Force and became the first zoologists who extensively collected in the Abor country in November 1911–April 1912. An impressive volume, "The Zoological Results of Abor Expedition" was published by the Indian Museum in 1912–1922 in 18 parts. There, Henderson (1913) listed two more common species of scorpions ("*Scorpiops longimanus* Poc. and *Chaerilus tricostatus* Poc.") collected by Kemp in the "Abor country", now in Arunachal Pradesh, the most northeastern state of India.

One of the most interesting discoveries of the Abor Expedition was *Typhloperipatus williamsoni* Kemp, 1913, a new genus and species of velvet worm (Onychopora), the only one known from India. Kemp (1914: 472) wrote: "The specific name is given in honour of the late Mr. Noel Williamson, one time Assistant Political Officer at Sadiya, who was treacherously murdered by Minyong Abors on March 30th, 1911, at Komsing, a village not many miles distant from the spot where the specimens were obtained. It was owing, chiefly, to the murder of Mr. Williamson and of his companion, Dr. Gregorson, that the expedition of 11–12 was undertaken."

Figures 156–160. *Scorpiops vonwicki* Birula, 1913 **stat**. **n**., female holotype. Dorsal (156) and ventral (157) views. Metasoma and telson lateral (158), dorsal (159), and ventral (160) views. Scale bars: 10 mm (156–157, 158–160).

Figures 161–**169**. *Scorpiops vonwicki* Birula, 1913 **stat**. **n**., female holotype, pedipalp segments. Chela dorsal (161), external (162) and ventral (163) views. Patella dorsal (164), external (165) and ventral (166) views. Femur and trochanter dorsal (167) view. Movable finger (168) and fixed finger (169) dentition. Trichobothrial pattern is indicated by white circles



Figures 170–174. *Scorpiops vonwicki* Birula, 1913 **stat**. **n**., female holotype, carapace and tergites I–III (170), posterior coxosternal area and sternites III–IV (171), right legs III–IV, retrolateral aspect (172–173 respectively), telson lateral (174).

Several other new species in the same volume honored Williamson and Gregorson. The famous Himalayan explorer, Lieutenant-Colonel Henry Haversham Godwin-Austen (1834–1923), named a new genus and species of land snail, *Rotungia williamsoni*, explaining: "I name this species in honour and in memory of Mr. Noel Williamson of the Indian Civil Service, who lost his life (30th March, 1911) penetrating into wilds of the Abor country, keen on their exploration and the desire of getting on friendly relations with the tribesmen. ... His murder led to the expedition up the Tsanspu, to the subjection of the Abors, and the accurate mapping by the officers of the Indian Survey of a vast area of unknown country in this part of the Eastern Himalaya, while the zoological collections have proved of extraordinary value and interest." (Godwin-Austen, 1918: 591).

As we can see, von Wick collected at the same time but completely independently from the Abor Expedition (which he did not mention) and did not venture beyond Sadiya into the dangerous "mountains of the Abors". Several specimens of "*Scorpiops longimanus*" collected by von Wick elsewhere in Assam (now Meghalaya State) are listed in the same paper by Birula (1913: 416).

It is now evident that the sole specimen, described as *Scorpiops petersi von-wicki* by a famous Russian scorpiologist Alexei A. Birula, was a gift passed on from Noel Williamson. His grave still exists in the village of Komsing on Siang River, with an original stone inscription and a more recent brass plaque "On this spot was murdered Noel Williamson, Assistant Political Officer Sadiya, 31st March 1911".

Distribution. India (Arunachal Pradesh State) (Fig. 240).

Scorpiops wrzecionkoi sp. n.

(Figures 175–185, 240, Table 2)

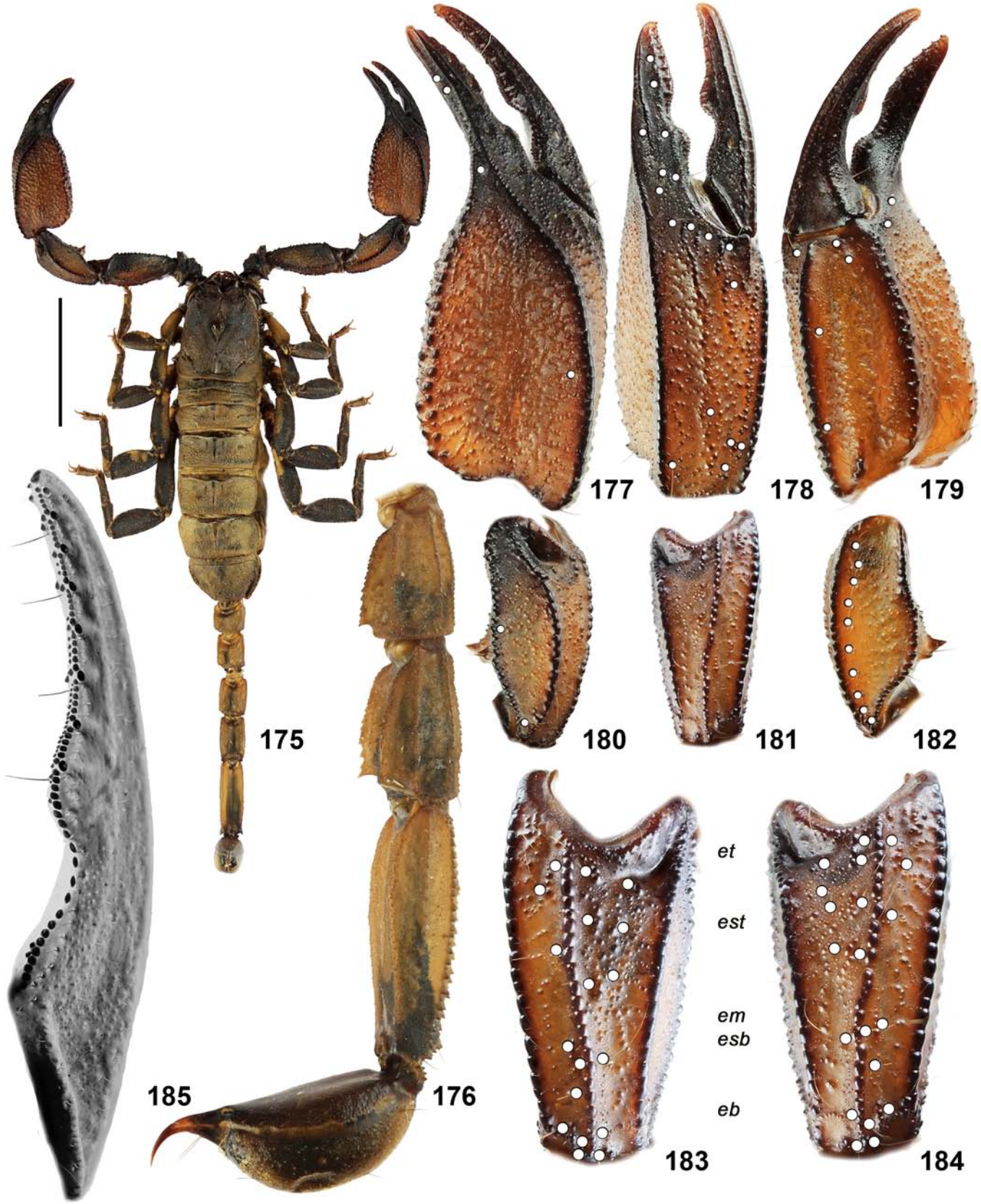
http://zoobank.org/urn:lsid:zoobank.org:act:B045E1F5-E683-4909-98AC-3BBCB0112C92

Type locality and type repository. China (Tibet), 100 km S. of Lhasa, Kamba La (29.20°N 90.58°E), 5000 m a. s. l.; FKCP.

Type material. **China** (Tibet), 100 km S. of Lhasa, Kamba La (29.20°N 90.58°E), 5000 m a. s. l., 8 June 2001, 1♀ (holotype) 1♀1juv. (paratypes), leg. A. Wrzecionko.

Etymology. The species epithet is a patronym honoring Antonín Wrzecionko, the collector of the types of the new species.

Diagnosis (♀). Total length of females 45–50 mm. Base color reddish brown to black including telson and legs. Pectinal teeth number 8–9 in females, fulcra present. Pectens have three marginal and 4 middle lamellae present. Patella of pedipalp with 18–20 (5 *eb*, 2 *esb*, 2 *em*, 5 *est*, 4–6 *et*) external and 9–11 ventral trichobothria. Chela of pedipalp with 4 ventral trichobothria located on ventral surface and two additional trichobothria eb_1 and eb_2. Chelal trichobothrium Eb_3 is located in the proximal half of manus between trichobothria *Dt* and *Db*. Fingers of pedipalps flexed in female. Chela length to width ratio 2.7 in females. Pedipalp movable finger with ca 30 IAD, which form a second row, parallel to MD (ca 60 in number); there are also 4 ID and 8 OD present. Tarsomere II of legs with 6–9 stout median ventral spines in a row and two other two parallel spines. Metasoma I with 10, and metasoma



Figures 175–**185**: *Scorpiops wrzecionkoi* **sp**. **n**., female holotype. **Figures 175**. Dorsal view. **Figures 176**. Metasoma III–V and telson lateral. **Figures 177**–**185**. Pedipalp segments. Chela dorsal (177), external (178) and ventral (179) views. Patella dorsal (180), external (181) and ventral (182) views. Patella external left (183) and right (184) comparison. Movable finger dentition under UV fluorescence (185).Trichobothrial pattern is indicated by white circles. Scale bar: 10 mm (175).

II–IV with 8 carinae. Telson bulbous and sparsely granulate, length to depth ratio 2.6 in females; annular ring present.

Description (♀ holotype). Total length 45–50 mm of females, male unknown. The habitus is shown in Fig. 175. For position and distribution of trichobothria of pedipalps, see Figs. 177–180 and 182–184. Fingers of pedipalps are flexed in female (Fig. 178).

Coloration (Fig. 175). The base color is uniformly reddish brown to black including telson and legs. Chelicerae are reddish black and reticulate.

Carapace and mesosoma (Fig. 178). The entire carapace is covered both large and minute granules; carinae are absent. The anterior margin of the carapace is markedly depressed, convex in the middle. The carapace bears three lateral eyes. The mesosoma is granulated, with one median carina. Tergite VII is pentacarinate. The sternites are finely granulated with two parallel furrows except sternite VII, which bears four sparsely granulate carinae. Pectinal teeth number 8–9 in females, fulcra are present. The pectens have three marginal and 4 middle lamellae present.

Metasoma and telson (Fig. 176). The metasoma is very sparsely hirsute and granulated, with relatively large granules. Metasomal segment I with 10, II–IV with 8, and V with 5 carinae. The median lateral carinae of metasoma II and V are indicated by isolated granules that may coalesce into carinae. The dorsolateral carinae of segments III and IV granulate with sharp granules, which are posteriorly terminated with a pronounced tooth. The telson is bulbous and sparsely granulate, with annular ring present.

Pedipalps (Figs. 177–184). The pedipalps are very sparsely hirsute. The patella bears 18–20 (5 *eb*, 2 *esb*, 2 *em*, 5 *est*, 4–6 *et*) external and 9–11 ventral trichobothria. The chela bears 4 ventral trichobothria located on the ventral surface and two additional trichobothria eb_1 and eb_2 (Fig. 178). The femur and patella are granulated. The femur has 5 granulose carinae and the patella has 5 complete carinae with developed dorsal and ventral patellar spurs. The manus dorsally bears fine, rounded granules, which are not enlarged in the central area. The external surface of the chela is covered by minute and larger sparse granules, which indicate another carina. The movable fingers with 29–32 IAD, which form a second row, parallel to MD (ca 60 in number); there are also 4 ID and 8 OD present.

Legs. The tibia and tarsomeres of legs with several setae not arranged into bristlecombs on dorsal surfaces but with rows of spines on dorsolateral and ventrolateral surfaces. Tarsomere II of legs I–IV with 6–9 stout median ventral spines in a row and two other parallel spines. The femur bears 3–4 and patella, 4–5 incomplete carinae; both femur and patella are finely granulated.

Measurements. See Table 2.

Affinities. The described features distinguish *S. wrzecionkoi* **sp**. **n**. from all other species of the genus. Among species, which have chelal trichobothrium Eb_3 located in proximal half of external surface between trichobothria *Dt* and *Db*, only two other species have more than 17 external trichobothria on the pedipalp patella. *S. demisi* Kovařík, 2005 from India has 18 of these trichobothria but has 14–15 ventral trichobothria on the patella (*S. wrzecionkoi* **sp**. **n**. has 9–11 of these trichobothria) and has an elongate telson with length to depth ratio 3.6 in the female (*S. wrzecionkoi* **sp**. **n**. has telson bulbous with the ratio 2.6 in females). *S. lindbergi* Vachon, 1980 from Afghanistan and Pakistan has 17–19 external trichobothria on the pedipalp patella but differs from *S. wrzecionkoi* **sp**. **n**. in many characters, mainly in having light color and straight fingers in females.

Distribution. China (Tibet) (Fig. 240).

Scorpiops yagmuri **sp**. **n**.

(Figures 186–204, 240, Table 3)

http://zoobank.org/urn:lsid:zoobank.org:act:8814751C-DF35-4673-ADFB-86A41F7271AC

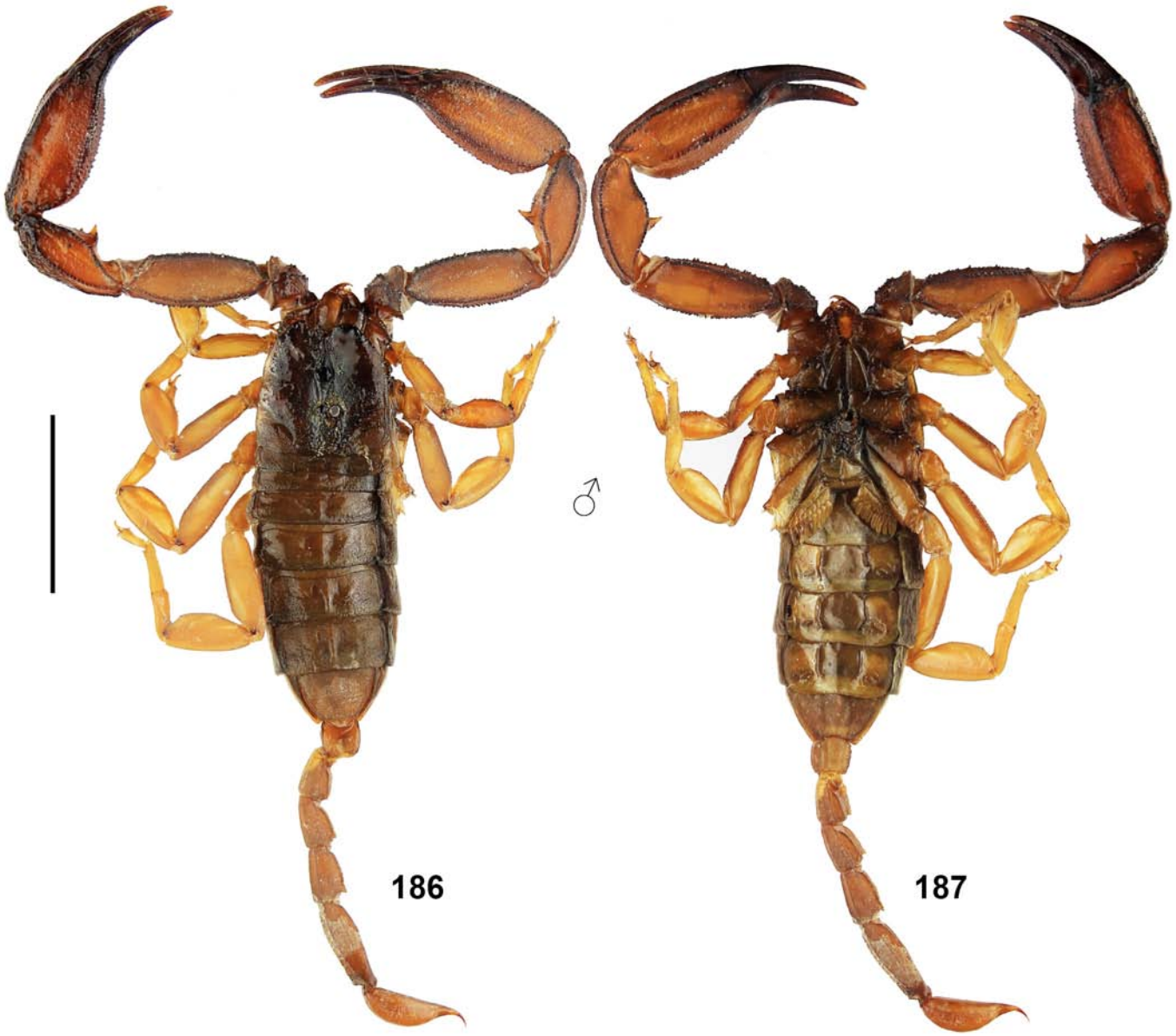
Type locality and type repository. Pakistan, Khyber Pakhtunkhwa Province (formerly North-West Frontier Province), Swat District, Matta (34.84°N 72.21°E); FKCP.

Type material. **Pakistan**, Khyber Pakhtunkhwa Province (formerly North-West Frontier Province), Swat District, Matta (34.84°N 72.21°E), 25 October 2006, 1♂1♀ (paratypes), 28 July 2007, 1♂ (holotype) 3♂juvs.4♀juvs. (paratypes), leg. Zubair Ahmed; FKCP.

Etymology. This species is named after my good friend and colleague, a prominent scorpiologist Ersen Aydın Yağmur (Turkey).

Diagnosis (♂♀). Total length 43–47 mm. Base color uniformly orange to brown, legs yellow. Pectinal teeth number 8–9 in males, 7–8 in females; fulcra absent; three marginal and five middle lamellae present. Patella of pedipalp with 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 18 ventral trichobothria. Chela of pedipalp with 4 ventral trichobothria located on ventral surface. Chelal trichobothrium Eb_3 is located in the proximal half of external surface between trichobothria *Dt* and *Db*. Fingers of pedipalps flexed in both sexes. Chela length to width ratio 3.57 in males, 3.40 in females. Pedipalp movable finger with ca 70 IAD, which have the same size as MD (more than 100 in number) and form a second row; there are also 5 ID and 13–15 OD present. Tarsomere II of leg III with seven stout median ventral spines in a row and two other parallel spines. Metasoma I with 10, and metasoma II–IV with 8 carinae. Telson elongate and granulate, length to depth ratio 3.43 in males and 3.00 in females; annular ring indicated.

Description (♂♀). Total length 43–47mm. The habitus is shown in Figs. 186–187. For position and distribution of trichobothria of pedipalps see Figs. 188–194. Sexual dimorphism: adult males have relatively larger pectens; fingers of pedipalps are flexed in both sexes.



Figures 186–187. *Scorpiops yagmuri* **sp. n.**, male holotype in dorsal (186) and ventral (187) views. Scale bar: 10 mm.

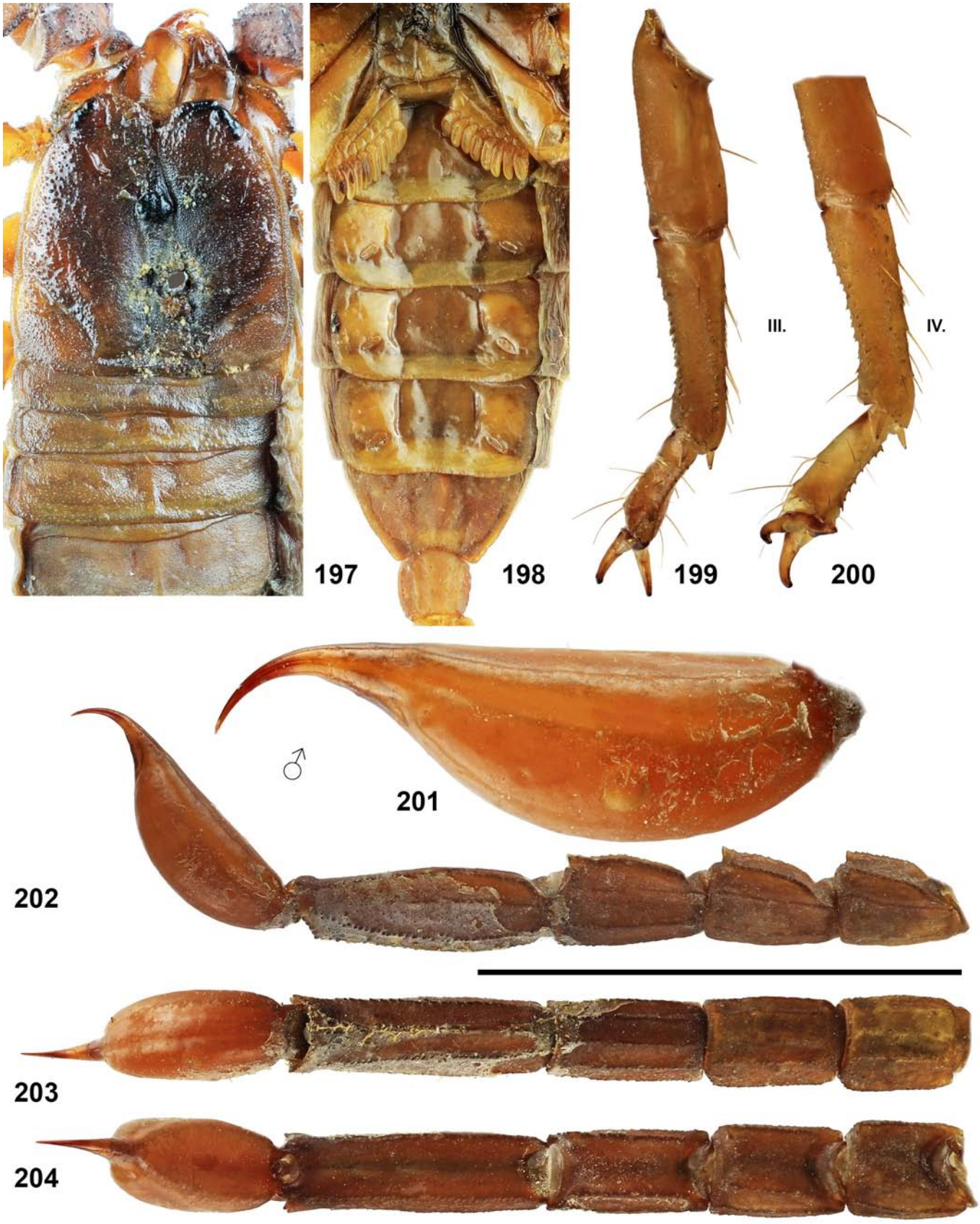
Coloration (Figs. 186–187). The base color is uniformly orange to brown, legs yellow, telson orange. Chelicerae are yellow and slightly reticulate, fingers reddish black.

Carapace and mesosoma (Figs. 197–198). The entire carapace is covered with large granules; carinae are absent. The anterior margin of the carapace is markedly depressed, convex in the middle. The carapace bears three lateral eyes, of which two are normal and one is reduced. The mesosoma is granulated, with one median carina. Tergite VII is pentacarinate. The sternites are smooth with two parallel furrows except sternite VII, which is finely granulated with two carinae indicated. Pectinal teeth number 8–9 in males, 7–8 in females. The pectens have 3 marginal lamellae and 5 middle lamellae; fulcra are absent.

Metasoma and telson (Figs. 201–204). The metasoma is sparsely hirsute and granulated, with sparse granules. Metasomal segment I with 10, II–IV with 8, and V with 5 carinae. The median lateral carinae of metasoma V are indicated by isolated granules that may coalesce into carinae. The dorsolateral carinae of segments II–IV posteriorly terminated in a pronounced tooth. The telson is elongate and smooth, with annular ring indicated.

Pedipalps (Figs. 188–196). The pedipalps are very sparsely hirsute. The patella of pedipalp with 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 18 ventral trichobothria. The chela bears 4 ventral trichobothria located on the ventral surface. The femur and patella are finely granulated. The femur has 5 granulose carinae, and the patella has 5 carinae with pronounced dorsal and ventral patellar spurs. The manus dorsally bears fine, rounded granules, which in the central area do not form another carina. The external surface of the chela is densely covered by minute granules and bears an almost complete median carina.

Figures 188–**196**. *Scorpiops yagmuri* **sp**. **n**., male holotype, pedipalp segments. Chela dorsal (188), external (189) and ventral (190) views. Patella dorsal (191), external (192) and ventral (193) views. Femur and trochanter dorsal (194), and ventral (195) views. Movable finger dentition (196). Trichobothrial pattern is indicated by white circles.



Figures 197–**204**. *Scorpiops yagmuri* **sp**. **n**., male holotype. Carapace and tergites I–IV (197), posterior coxosternal area and sternites including metasoma I ventral (198). Left legs III–IV, retrolateral aspect (199–200 respectively). Telson lateral (201). Metasoma and telson lateral (202), ventral (203), and dorsal (204) views. Scale bar: 10 mm (202–204).

The movable fingers bear ca 70 IAD, which have the same size as MD (more than 100 in number) and form a second row. There are also 5 ID and 13–15 OD present.

Legs (Figs. 199–200). The tibia and tarsomeres of legs with several setae not arranged into bristlecombs on dorsal surfaces but with rows of spines on dorsolateral surfaces and on legs I–II and partly III also on ventrolateral surface. Tarsomere of legs I–IV with 5–7 stout median ventral spines in a row and two other parallel spines. The femur bears 3–4 incomplete and patella, 4–5 developed carinae.

Measurements. See Table 3.

Affinities. The described features distinguish *S. yagmuri* **sp**. **n**. from all other species of the genus. Among species, which have chelal trichobothrium Eb_3 placed in proximal half of external surface between trichobothria *Dt* and *Db*, only one other species, *S. pseudomontanus* Kovařík & Ahmed, 2009, has 18 ventral trichobothria on the pedipalp patella. It is possible to differentiate these two species according to the shape of chela because chela length/width ratio in female is 3.4 in *S. yagmuri* **sp**. **n**. and 2.9 in *S. pseudomontanus*; the movable fingers bear ca 70 IAD in *S. yagmuri* **sp**. **n**. and ca 45 in *S. pseudomontanus*.

Distribution. Pakistan (Fig. 240).

Scorpiops zubairi **sp**. **n**.

(Figures 205–240, Table 3)

http://zoobank.org/urn:lsid:zoobank.org:act:26E6A285-856D-4234-92E7-D45765941FBE

Type locality and type repository. Pakistan, Azad Kashmir, Bagh (35.09°N 71.04°E); FKCP.

Type material (FKCP). **Pakistan**, Azad Kashmir, Bagh (35.09°N 71.04°E), 1♂ (holotype) 2♀ims. (paratypes), 12 June 2008, leg. Zubair Ahmed; Khyber Pakhtunkhwa Province (formerly North-West Frontier Province), Swat District, Ilam (34.62°N 72.31°E), 1♀(Table 3)1im. (paratypes), 5 September 2010, leg. Zubair Ahmed; Khyber Pakhtunkhwa Province (formerly North-West Frontier Province), Upper Dir District (35.31°N 71.39°E), 2♀ims. (paratypes), 13 May 2010, leg. Zubair Ahmed.

Etymology. The species epithet is a patronym honoring Zubair Ahmed, the collector of the types of the new species.

Diagnosis (♂♀). Total length 37 mm (male) to 40 mm (female). Base color uniformly reddish black to black, telson and tarsomere II of legs reddish black. Pectinal teeth number 6–7 in male, 5 in females, fulcra absent. Marginal lamella I (basal) present or indicated, the remainder of the pectinal surface forming one compact unit. Patella of pedipalp with 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 6–7 ventral trichobothria. Chela of pedipalp with 4 ventral trichobothria located on the ventral surface. Chelal trichobothrium Eb_3 is located in proximal half of external surface between trichobothria *Dt* and *Db*. Fingers of pedipalps flexed in male and undulate in female. Chela length to width ratio 2.1–2.2 in both sexes. Pedipalp movable finger with 7–8 larger and 15–18 smaller IAD among them, which form a second row, parallel with MD (ca 45 in number); there are also 4 ID and 8–9 OD present. Tarsomere II of legs with 5–7 stout median ventral spines in a row and two other parallel spines. Metasoma I with 10, and metasoma II–IV with 8 carinae. Telson bulbous and granulate, length to depth ratio 2.12 in male and 2.26 in female; annular ring developed in both sexes.

Description (♂♀). Total length 37 mm (male) to 40 mm (female). The habitus is shown in Figs. 205–208. For position and distribution of trichobothria of pedipalps, see Figs. 219–224. Sexual dimorphism minor: adult males have relatively larger pectens and fingers of pedipalps are flexed in male and undulate in female (Figs. 212 and 220).

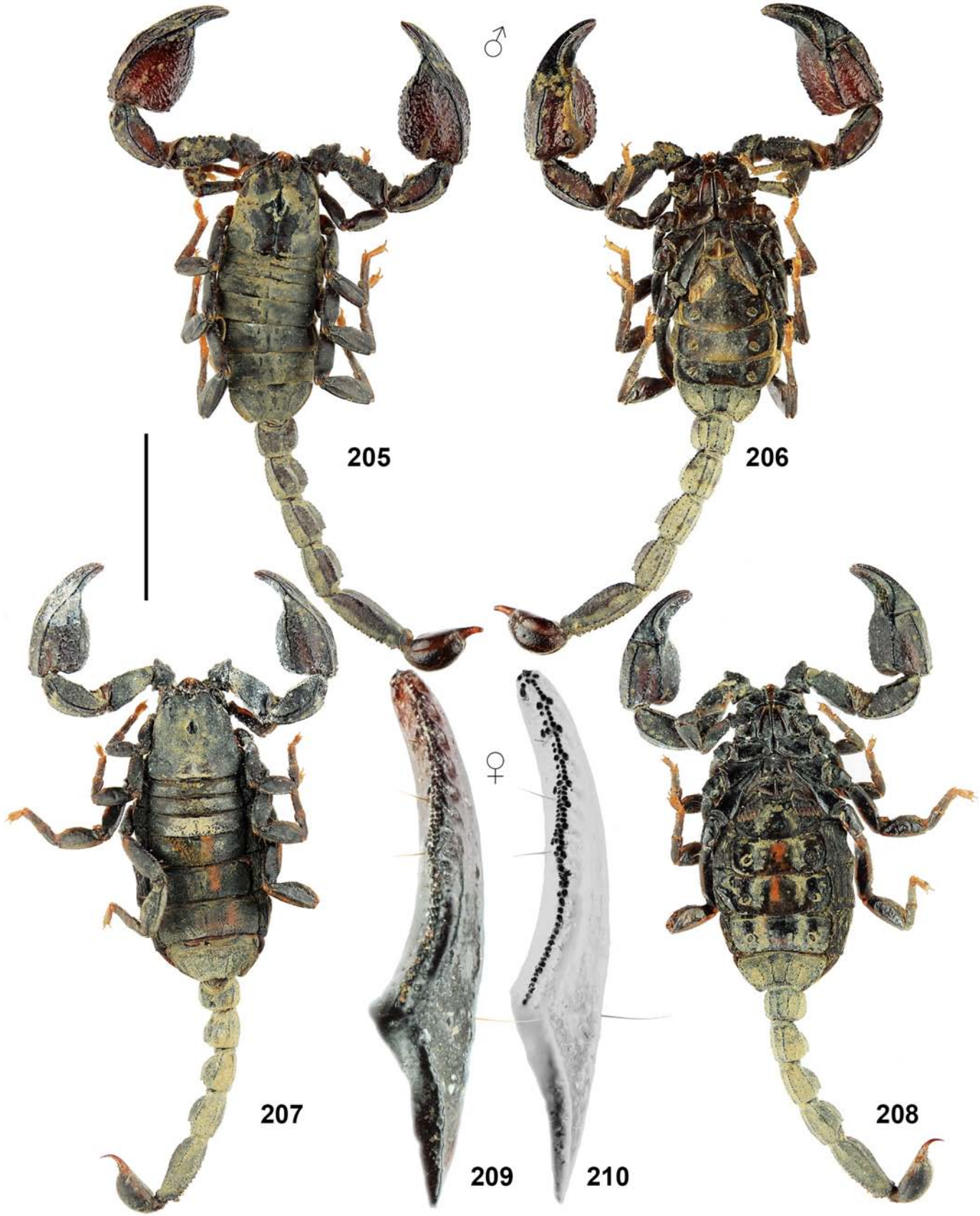
Coloration (Figs. 205–208). The base color is uniformly reddish black to black, telson and tarsomere II of legs reddish black. Chelicerae are reddish brown.

Carapace and mesosoma (Figs. 205–208, 225–227). The entire carapace is covered with large and minute granules; carinae are absent. The anterior margin of the carapace is markedly depressed, convex in the middle. The carapace bears three lateral eyes. The mesosoma is granulated, with one median carina. Tergite VII is pentacarinate. The sternites are smooth to finely granulated with two parallel furrows except sternite VII, which bears four sparsely granulate carina. Pectinal teeth number 6–7 in male and 5 in females, fulcra are absent. The marginal lamella I (basal) is present or indicated, the remainder of the pectinal surface forming one compact unit.

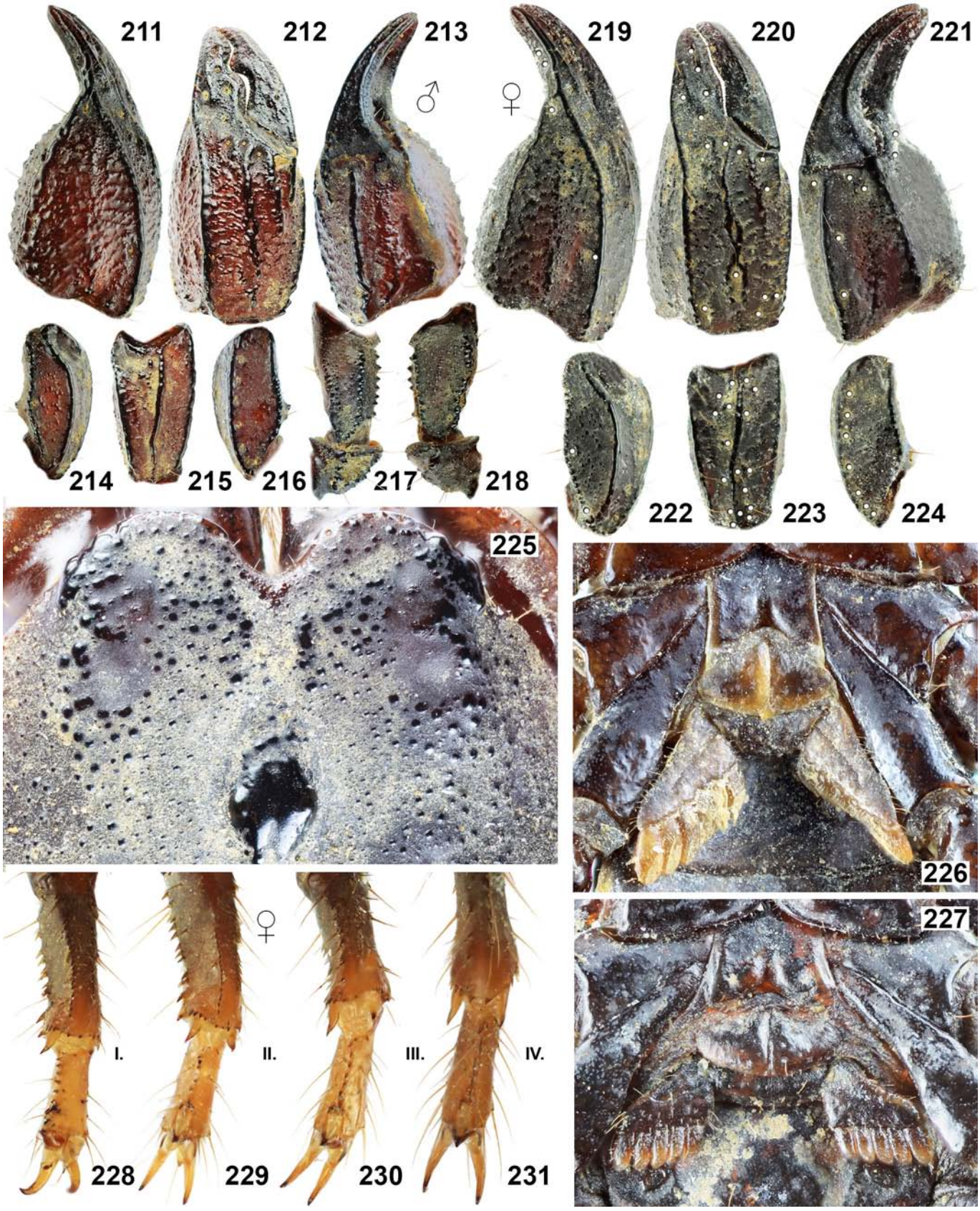
Metasoma and telson (Figs. 232–239). The metasoma is sparsely hirsute and granulated, with sparse, relatively large granules. Metasomal segment I with 10 carinae, II–IV with 8 carinae, and V with 5 carinae. The median lateral carinae of metasoma V are indicated by isolated granules that may coalesce into carinae. The dorsolateral carinae of segments III and IV posteriorly are not terminated in a pronounced tooth. The telson is bulbous and granulate, with annular ring developed in both sexes, more in male.

Pedipalps (Figs. 209–224). The pedipalps are very sparsely hirsute. The patella bears 17 (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 4 *et*) external and 6–7 ventral trichobothria. The chela bears 4 ventral trichobothria located on ventral surface. The femur and patella are granulated. The femur has 5 granulose carinae, and the patella has 5 carinae with reduced dorsal and ventral patellar spurs. The manus bears rounded reticulate granules of different sizes. The external surface of the chela bears a complete median carina and other parallel carinae in anterior part. The movable fingers with 7–8 larger and 15–18 smaller IAD among them, which form a second row, parallel to MD (ca 45 in number). There are also 4 ID and 8–9 OD present.

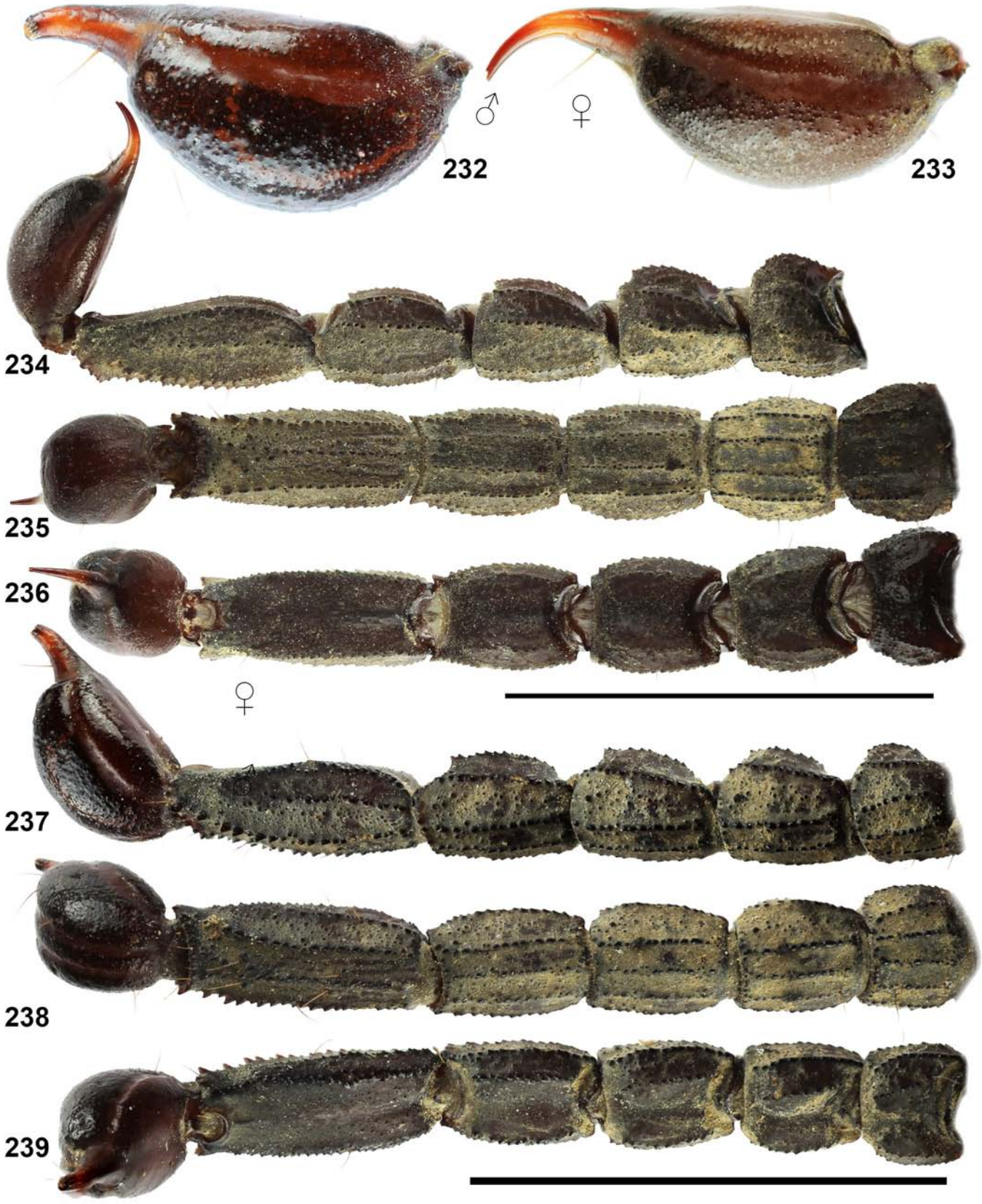
Legs (Figs. 228–231). The tibia and tarsomeres of legs with several setae not arranged into bristlecombs on dorsal surfaces but with rows of spines on dorsolateral and ventrolateral



Figures 205–**210**: *Scorpiops zubairi* **sp**. **n**. **Figures 205**–**206**. Male holotype in dorsal (205) and ventral (206) views. **Figures 207**–**210**. Female paratype in dorsal (207) and ventral (208) views, and movable finger dentition under white light (209) and UV fluorescence (210). Scale bar: 10 mm (205–208).



Figures 211–**231**: *Scorpiops zubairi* **sp**. **n**., male holotype (211–218, 226) and female paratype (219–225, 227–231). **Figures 211**–**224**. Pedipalp segments. Chela dorsal (211, 219), external (212, 220) and ventral (213, 221) views. Patella dorsal (214, 222), external (215, 223) and ventral (216, 224) views. Femur and trochanter ventral (217) and dorsal (218) views. Trichobothrial pattern is indicated by white circles (219–224). **Figure 225**. Anterior part of carapace. **Figures 226**–**227**. Coxosternal areas. **Figures 228**–**231**. Left legs I–IV, retrolateral aspect.



Figures 232–**239**: *Scorpiops zubairi* **sp**. **n**., metasoma and telson. **Figures 233**–**236**. Female paratype, telson lateral (233), metasoma and telson lateral (234), ventral (235), and dorsal (236) views. **Figures 232**, **237**–**239**. Male holotype, telson lateral (232), metasoma and telson lateral (237), ventral (238), and dorsal (239) views. Scale bar: 10 mm (234–236, 237–239).

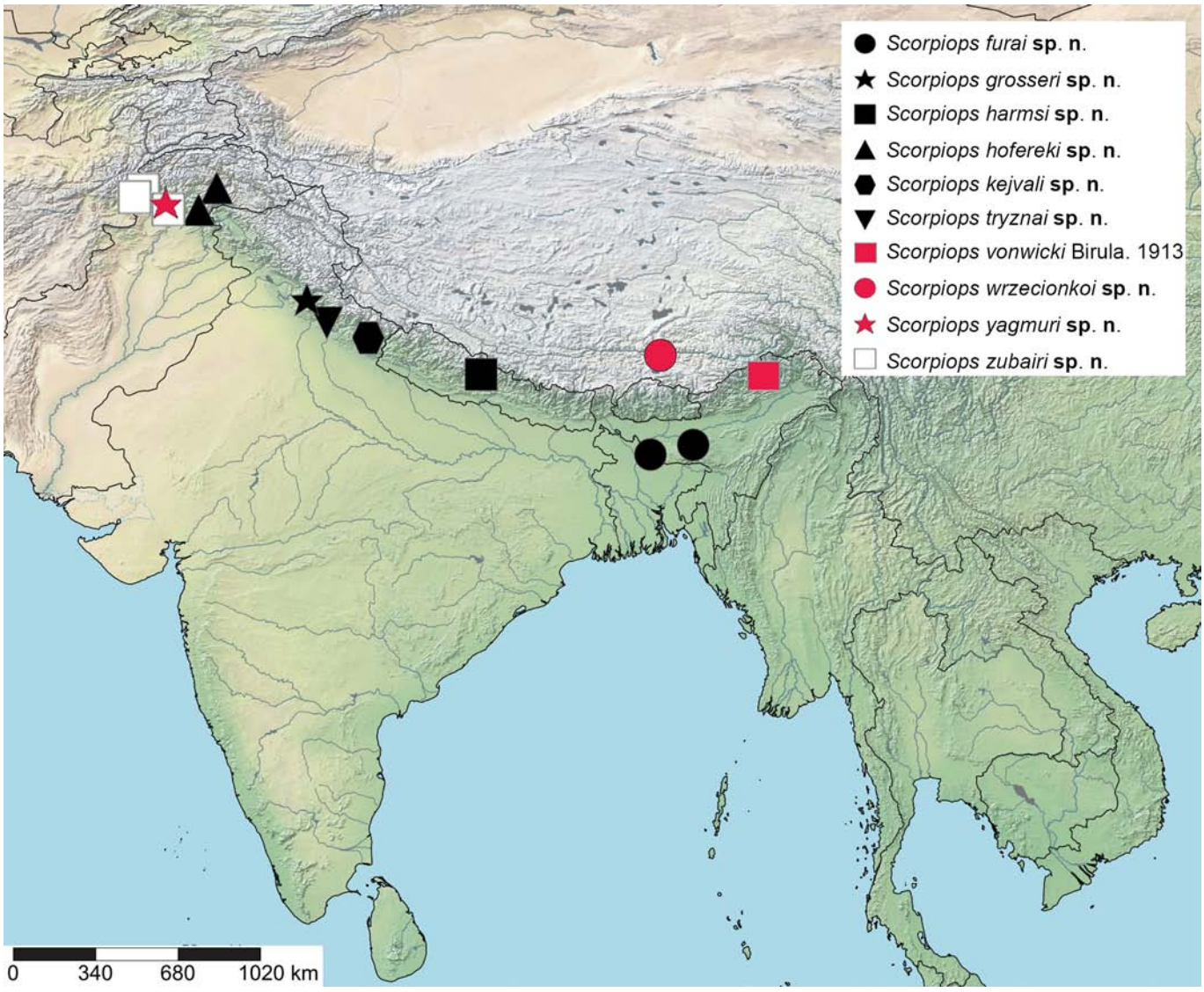


Figure 240. Map of distribution of nine new species described here and *Scorpiops vonwicki* Birula, 1913.

surface. Tarsomere II of legs I–IV with 5–7 stout median ventral spines in a row and two other parallel spines. The femur bears 3–4 and patella, 4–5 carinae; both femur and patella are granulated.

Measurements. See Table 3.

Affinities. The described features distinguish *S. zubairi* **sp. n.** from all other species of the genus. The new species is similar to *Scorpiops hardwickii*. It is possible to differentiate these two species according to the shape of chela, because the chela length/width ratio is 2.1–2.2 in *S. zubairi* **sp. n.** and 2.5 in the male holotype of *S. hardwickii*. The granules on the manus are reticulated and connected in *S. zubairi* **sp. n.** versus separated in *S. hardwickii*. The telson is more bulbous in the male of *S. hardwickii* with length to depth ratio 2.4 versus 2.12 in the male of *S. zubairi* **sp. n.** *S. zubairi* **sp. n.** is known from Pakistan (Fig. 240) while the type locality of *S. hardwickii* is "Himalaya (Nepal)" (Gervais, 1844: 66). Also studied were specimens of *S. hardwickii* from India, Uttarakhand (formerly Uttaranchal) State, ca 30 and 55 km from Bageshwar (29.84°N 79.73°E) relatively near to the India/Nepal border. It is assumed that *S. hardwickii* occurs only in the area around India/Nepal border and that specimens cited from other localities are misidentifed and need to be revised.

Distribution. Pakistan (Fig. 240).

Acknowledgements

Thanks are due to Czech and Slovak entomologists and travelers V. Fura, W. Grosser, E. Jendek, Z. Kejval, O. Šauša, J. Schmidt, M. Trýzna, and A. Wrzecionko, and to Z. Ahmed from Pakistan who passed specimens on to the author. Special thanks to Ersen Aydin Yağmur, Victor Fet, and Jakub Rolčík for their help in many fields.

Thanks are due also to Viktor A. Krivokhatsky, Alexander Koval, Julia V. Samartseva, Sergey Yu. Sinev, and other employees of the Zoological Institute, Russian Academy

Figures 241. *Scorpiops furai* **sp**. **n**., locality of paratype, India, Meghalaya State, Nongpoh env.

of Sciences, St. Petersburg, Russia for their hospitality and help to the author and to Ersen Aydin Yağmur in 2018-2019 while studying and imaging the wonderful Birula scorpion collection in St. Petersburg.

I thank Victor Fet for researching the fascinating historical details on the type locality of *Scorpiops vonwicki*, the Abor Hills.

I am also indebted to V. Fura for kindly giving permission to use his photograph from India herein as Figure 241.

References

BIRULA, A. A. 1913. Arachnologische Beiträge. II.–IV. II. Ueber einige *Scorpiops*-Arten von dem Südabhange des Himalaya. III. Ueber *Pandinus* (*Pandinops*) *peeli* Poc. und seine Verwandten. IV. Ueber das Vorkommen der gemeinen Perlmutterzecke (*Dermacentor reticulatus* [Fabr.] – Ixodidae) in den mittleren Teilen Westrusslands. *Revue Russe d'Entomologie*, 13(3–4): 416–423.

FET, V. 2000. Family Scorpiopidae Kraepelin, 1905. Pp. 487–495 *in* Fet, V., W. D. Sissom, G. Lowe & M. E. Braunwalder. 2000. *Catalog of the Scorpions of the World (1758–1998).* New York: The New York Entomological Society, 689 pp.

FRANCKE, O. F. 1976. Redescription of *Parascorpiops montana* Banks (Scorpionida, Vaejovidae). *Entomological News* 87(3): 75–85.

GERVAIS, P. 1844. Scorpions. *In* C. A. Walckenaer (ed.): *Histoire naturelle des Insectes.* Librarie Encyclopédique de Roret, Paris, 3(8): 14–74.

GODWIN-AUSTEN, H. H. 1918. XLVIII. Mollusca, VIII. Macrochlamyinae. In: The Zoological Results of the Abor Expedition 1911–1912. *Records of the Indian Museum*, 8: 581–600.

HENDERSON, J. R. 1913. Arachnida, I. C. Scorpiones. In: The Zoological Results of the Abor Expedition 1911–1912. *Records of the Indian Museum*, 8: 128–133.

KEMP, S. W. 1914. XXXVIII. Onychophora. In: The Zoological Results of the Abor Expedition 1911–1912. *Records of the Indian Museum*, 8: 472–492.

KOVAŘÍK, F. 1998. *Štíři* [*Scorpiones*]. Publishing House "Madagaskar", Jihlava (Czech Republic). 175 pp. (in Czech).

KOVAŘÍK, F. 2000. Revision of family Scorpiopidae (Scorpiones), with descriptions of six new species. *Acta Societatis Zoologicae Bohemicae*, 64: 153–201.

KOVAŘÍK, F. 2009. Illustrated catalog of scorpions. Part I. Introductory remarks; keys to families and genera; subfamily Scorpioninae with keys to *Heterometrus* and *Pandinus* species. Clairon Production, Prague, 170 pp.

KOVAŘÍK, F. & Z. AHMED. 2009. Three new species of the genus *Scorpiops* Peters, 1861 (Scorpiones, Euscorpiidae, Scorpiopinae) from Pakistan. *Euscorpius*, 88: 1–11.

KOVAŘÍK, F & A. A. OJANGUREN AFFILASTRO. 2013. Illustrated catalog of scorpions. Part II. Bothriuridae; Chaerilidae; Buthidae I., genera *Compsobuthus*, *Hottentotta*, *Isometrus*, *Lychas*, and *Sassanidotus*. Clairon Production, Prague, 400 pp.

KRAEPELIN, K. 1899. Scorpiones und Pedipalpi. In: F. DAHL (ed.), *Das Tierreich. Herausgegeben von der Deutschen Zoologischen Gesellschaft.* Berlin: R. Friedländer und Sohn Verlag, 8. Lieferung, 265 pp.

LOURENÇO, W. R. 1998. Designation of the scorpion subfamily Scorpiopsinae Kraepelin, 1905 as family Scorpiopsidae Kraepelin, 1905 (stat. nov.): its generic composition and a description of a new species of *Scorpiops* from Pakistan (Scorpiones, Scorpiopsidae). *Entomologische Mitteilungen aus dem Zoologischen Museum Hamburg*, 12(157): 245–254.

PETERS, W. 1861. Über eine neue Eintheilung der Skorpione und über die von ihm in Mossambique gesammelten Arten von Skorpionen. *Monatsberichte der Königlichen Preussischen Akademie der Wissenschaften zu Berlin*, 1861: 507–520.

QI, J.-X., M.-S. ZHU & W. R. LOURENÇO. 2005. Eight new species of the genera *Scorpiops* Peters, *Euscorpiops* Vachon, and *Chaerilus* Simon (Scorpiones: Euscorpiidae, Chaerilidae) from Tibet and Yunnan, China. *Euscorpius*, 32: 1–40.

SISSOM, W. D. 1990. Systematics, biogeography and paleontology. Pp. 64–160. In: Polis, G. A. (ed.), *The Biology of Scorpions.* Stanford: Stanford University Press, 587 pp.

SOLEGLAD, M. E. & W. D. SISSOM. 2001. Phylogeny of the family Euscorpiidae Laurie, 1896 (Scorpiones): a major revision. 25–111 in: Fet, V. & P. A. Selden (eds.), *Scorpions 2001. In Memoriam Gary A. Polis.* British Arachnological Society: Burnham Beeches, Bucks., 404 pp.

STAHNKE, H. L. 1971. Scorpion nomenclature and mensuration. *Entomological News*, 81(12): 297–316.

TIKADER, B. K. & D. B. BASTAWADE. 1983. Scorpions (Scorpionida: Arachnida). In *The Fauna of India*, Vol. 3. (Edited by the Director). Calcutta: Zoological Survey of India, 671 pp.

VACHON, M. 1974. Etude des caractères utilisés pour classer les familles et les genres de Scorpions (Arachnides). 1. La trichobothriotaxie en Arachnologie. Sigles trichobothriaux et types de trichobothriotaxie chez les scorpions. *Bulletin du Muséum National d'Histoire Naturelle*, Paris, (3), 140 (Zool. 104), mai-juin 1973: 857–958.

VACHON, M. 1980. Essai d'une classification sous-générique des scorpions du genre *Scorpiops* Peters, 1861 (Arachnida, Scorpionida, Vaejovidae). *Bulletin du Muséum National d'Histoire Naturelle*, Paris, (A), 2(1): 143–160.

VON WICK, S. N. 1913. *Marshrut ekspeditsii Imperatorskoi Akademii nauk dlya sbora zoologicheskikh kollektsii v Assame* [An itinerary of the expedition of the Imperial Academy of Sciences to obtain zoological collections in Assam]. *Annuaire du Musée Zoologique de l'Académie Impériale des Sciences de St.-Petersbourg*, 18: I–XVI. (in Russian; with a map).